THE ARCHITECT & BUILDING NEWS

20 DECEMBER 1956 · VOL. 210 · NO. 25 · ONE SHILLING WEEKLY

- CHURCH GROUP, BENTLEY, STAFFS
- AIR CONDITIONING: EQUIPMENT

PUBLISHED IN LONDON SINCE 1854

CONCRETE CONTRIBUTIONS BY TWISTEEL

Reservoir, Cleadon, Northumberland. Engineer: A. G. McLellan, B.Sc., A.M.I.C.E., M.I.W.E., Sunderland & South Shields Water Co. Contractors: W. Moss & Sons Ltd.

To make sure of the highest standards in concrete design and construction, at the lowest cost in steel, money and time, call in the TWISTEEL Design Service. Their specialist knowledge, backed by many years of practical experience, enables them to advise architects and engineers, with certainty, on every aspect of design and planning for every type of construction involving the use of reinforced concrete: and they can also supply the reinforcement.

TWISTEEL DESIGN SERVICE

43 UPPER GROSVENOR STREET, LONDON, W.1 · TELEPHONE: GROSVENOR 1216

AND AT BIRMINGHAM MANCHESTER GLASGOW

Stonyhurst College, Whalley, Lancashire. Roofed with Ruberoid Roofing. Architect: Wilfrid C. Mangan, M.I.A.A.S.

Built-up roofings carried out to standard specifications may differ widely in quality of materials and workmanship. But a specification which stipulates that the work is to be carried out by the Ruberoid Roofing Service ensures the highest standards every time.

The best possible materials . . .

The Ruberoid materials used are world renowned for their weather resistance and durability. By refining and blending selected bitumens, and by making the base felts from which the roofings are manufactured, the Ruberoid Factories are able to control quality throughout.

. . . laid in the best possible way

Ruberoid materials, in the hands of Ruberoid craftsmen, ensure a built-up roof without equal, in which the greatest care is taken with specified and unspecified details.

Ruberoid specifications are listed in detail in Publication No. 326.

Special Features of The Ruberoid Roofing Service

- Built-up roofing undertaken on buildings of any shape or size—anywhere in Britain.
- Specifications include roof decks of steel, aluminium and asbestos cement, all these being insulated externally and weatherproofed with Ruberoid.
- Representatives and Branches throughout the country will give immediate attention to plans and estimates.
- Comprehensive service includes consultation, inspection and maintenance. Call in Ruberoid at an early stage.

RUBEROID

TRADE MARK RUBEROID REGISTERED

Roofing Service

THE RUBEROID COMPANY LIMITED 344 Commonwealth House · 1-19 New Oxford Street · London · W.C.1

C.187

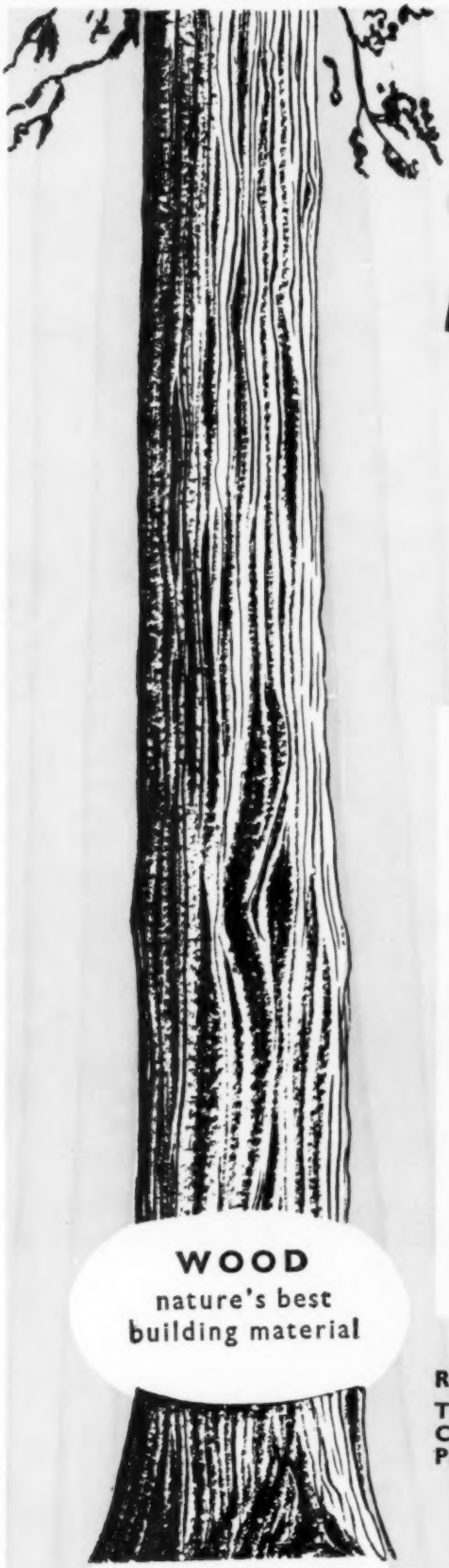
A

Exposed Aggregate Cladding Panels can be supplied in a variety of different finishes, including Mountsorrel, Enderby and Cornish Granites, Derbyshire Spa, Flints, Gravels, etc. in modular sizes or to Architects' special requirements.

JOHN ELLIS & SONS LIMITED
21 NEW WALK · LEICESTER
Telephone: LEICESTER 56682

LONDON OFFICE 29 DORSET SQUARE N.W.1
Telephone: AMBassador 1141 & 1142

BIRMINGHAM OFFICE 46 EXCHANGE BUILDINGS STEPHENSON PLACE BIRMINGHAM 2
Tel: Midland 1757



WOOD
nature's best
building material

CANADIAN

Western Red Cedar

a warm toned wood that combines good working qualities with exceptionally high resistance to decay and changes in moisture content

TYPICAL USES

Boat construction, fish-net floats, conduits and shingles for roofing

Exterior finish, weather boarding or siding, window sashes, greenhouse construction

Fence-posts, telegraph and telephone poles, piling

Cabinets, panelling, clothes closets and chests

Pattern making and pencil slats

SPECIAL ADVANTAGES

Seasons readily with very little shrinkage — retains size and shape

Very durable in contact with soil or in other positions favouring decay

Straight grained — splits readily and uniformly

Good glueing properties

Quite soft and light—takes smooth satiny finish—takes stains and paints well

FOR FURTHER INFORMATION concerning Canadian woods contact The Commercial Counsellor (Timber), Canada House, Trafalgar Square, London, S.W.1

Reproduced here is figure of Western Red Cedar.

This advertisement is one of a series featuring Canadian Douglas Fir, Spruce, Red Pine, White Pine and Pacific Coast Hemlock.

TIM 4

A PROBLEM:

underwater protection for Melbourne's Olympic Swimming Stadium

The magnificent stadium built at Melbourne for the XVI Olympiad, houses two pools, one for swimming and one for diving. Right at the planning stage the question of the surface finish for the pools was considered. Above water, tiles were chosen, but the greater problem lay below the water line. Here was needed a coating that would adhere firmly to fresh concrete and resist its destructive alkaline action . . . a coating in which high performance balanced reasonable cost.

THE ANSWER:

a paint that lasts for years

In both pools the water is continually circulated at 70°F., purified by filtration and chlorination. Paints based on Shell's Epikote Resins were put under prolonged test as far back as 1954. The final modified amine-cured version chosen was proved to have the desired qualities — outstanding adhesion, and excellent resistance to abrasion and chemicals under wet conditions.

Surface coatings based on Epikote Resins are today solving many difficult and unusual problems of structural protection, especially under severe conditions where orthodox paints have failed. Ask your usual paint supplier for further information.

EPIKOTE EPOXY RESINS

THE NEW POWER IN PAINT

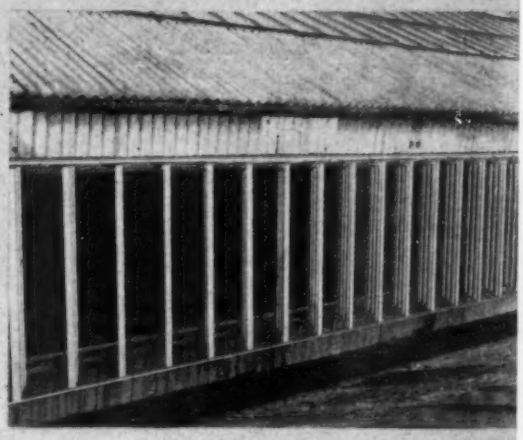
SHELL

SHELL CHEMICAL COMPANY LIMITED, NORMAN HOUSE, 105-109, STRAND, LONDON, W.C.2. TEL: TEMPLE BAR 4455

"EPIKOTE" is a Registered Trade Mark

Four methods of improved factory ventilation

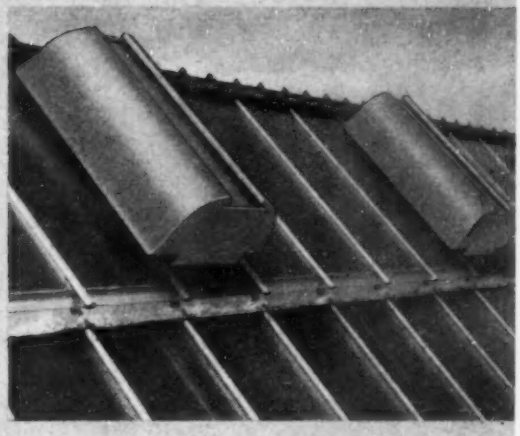
HILLS ROOF VENTILATING SHUTTERS



HILLS VENTILATING SHUTTERS -VERTICAL WALL APPLICATION

HILLS WALL-TYPE AIR INLET VENTILATORS

HILLS STACK ROOF VENTILATORS



HILLS Industrial Ventilators are designed to meet every requirement for efficient and economical ventilation in foundries, rolling mills, factories, workshops, etc. They provide positive and rapid extraction of smoke, fumes, steam and overheated air, and admit the fresh air essential to improve working conditions. All types of HILLS Industrial Ventilators are easy to install in new or existing buildings. For expert advice on any problem of industrial ventilation, we invite you to consult our Technical Advisory Department. Illustrated literature is available on request.

HILLS Ventilation Division

ALBION RD., WEST BROMWICH, STAFFS. Tel.: WESt Bromwich 1811 (15 lines). LONDON: CHAPONE PLACE, DEAN ST., W.1. Tel.: GERrard 0526/9.
Branches at Birmingham (Midland 5175), Manchester (Blackfriars 33823), Bristol (24765), Newcastle-on-Tyne (25060), Glasgow (City 5564), and Belfast (26112).

B

Important Revisions of British Standards for Lead Pipe

Many permissible minimum weights greatly reduced

The new standards permit the use of much lighter weight Lead pipes for low pressure hot and cold water distribution in buildings.

For this use, the new permissible minimum weights of 1/2", 3/4", 1" and 1 1/4" bore B.S. 602 pipe show an average saving of

38%

Tables incorporating the new British Standards for Lead pipe to B.S.602 and B.S.1085 have been prepared and are available in a revised edition of "CONCISE INFORMATION ON LEAD PIPE" free on request.

LEAD LASTS

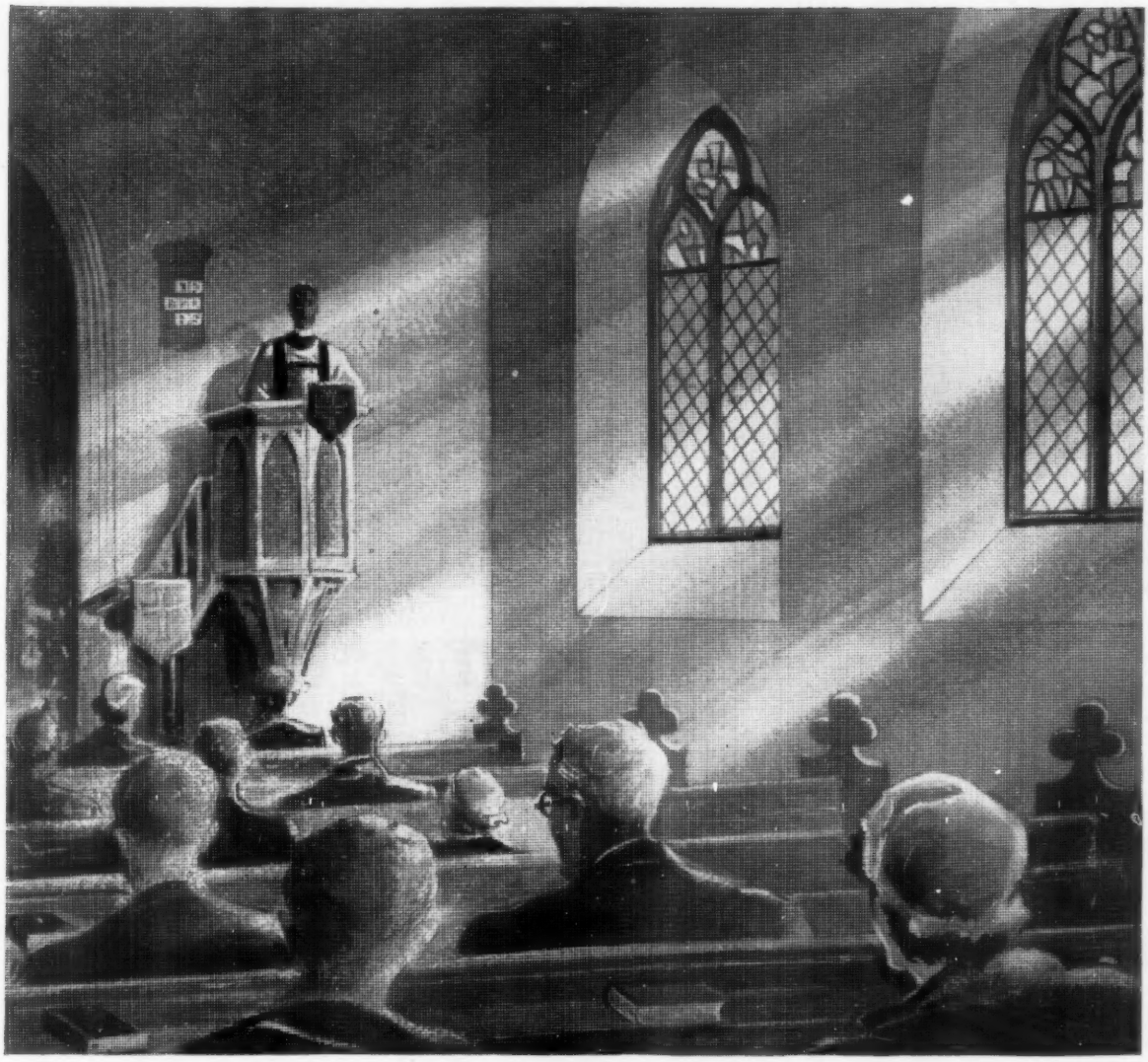
LEAD SHEET AND PIPE COUNCIL

In association with LEAD DEVELOPMENT ASSOCIATION

EAGLE HOUSE · JERMYN STREET · LONDON · SW1

Telegrams: Ukleadman, Piccy, London · Telephone: Whitehall 4175

B.129



AT PEACE WITHIN . . .

In our minds we all carry a picture like this one. It signifies a place of peace and quiet such as we long for in everyday life. Modern day living is cursed by noise, it is a destroyer of life to be ranked as a major concern. In industry, commerce and in every building project, John Dale are fighting this problem with all their technical and scientific resources. It is the battle of acoustics. John Dale offers a comprehensive Acoustical Advice Service to help you in your fight against noise. Research Laboratory · Mobile Survey Unit · Analyses and Reports · Designing · Installation · The problem of noise needs a scientific approach today. We offer you this Service and ask you to consult us before taking any firm decisions in matters concerning acoustics.

Leaflets on various treatments are available on request

JOHN DALE

ACOUSTICS DIVISION

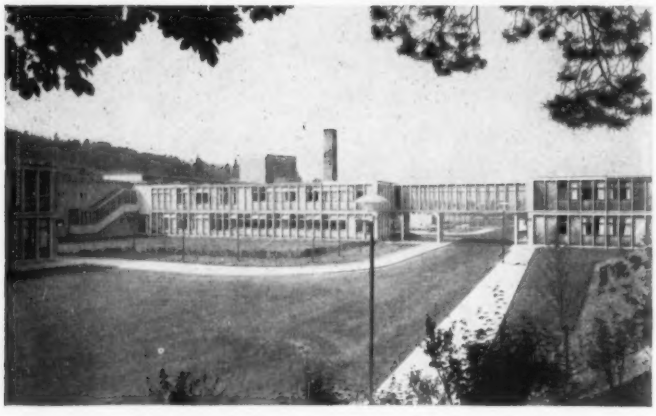
JOHN DALE LIMITED · NEW SOUTHGATE · LONDON N.11. Telephone: ENTerprise 1272

DHB.2561

County Secondary School, Derbyshire.
Architect : F. Hamer Crossley, F.R.I.B.A.
County Architect, Derbyshire.

CANADIAN TIMBER

for flexibility and efficiency



Vale of Leven Hospital,
Alexandria, Dumbartonshire

The wider use of timber, combined with new building techniques, has evolved architectural designs eminently suited to the economic construction of public buildings. These new designs and structural methods provide for more useful interior space, greater flexibility of planning, more freedom in the design of walls, windows and overhangs for sunlight control and covered walkways. Buildings go up faster, too. Framing members are often standardised and delivered pre-cut. Floor and wall sections, prefabricated off-site, fix into position quickly. Labour is used more efficiently and the cost of materials can be kept to the minimum.

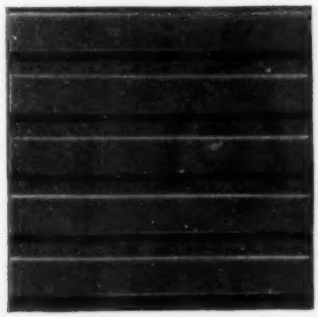
SEND FOR 'TRENDS IN TIMBER CONSTRUCTION'
—an 18-page pictorial study of timber's wide range of uses in present day structures of all types. Write for your free copy to:

COMMERCIAL COUNSELLOR (Timber)
DEPT. M.4., CANADA HOUSE,
TRAFALGAR SQUARE, LONDON SW1

CANADIAN TIMBER **FROM BRITISH COLUMBIA**

Pacific Coast Hemlock. Douglas Fir. Western Red Cedar. Sitka Spruce.

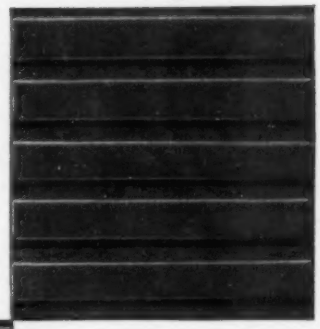
High quality timber produced by members BRITISH COLUMBIA LUMBER MANUFACTURERS ASSOCIATION

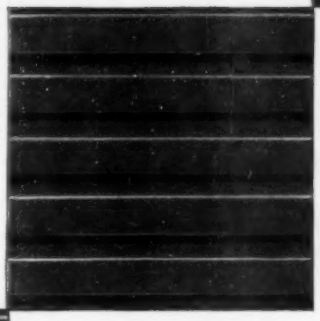


nothing is so quietly reliable as . . .

SUREFOOT
TILES

non-slip, heavy-duty rubber flooring





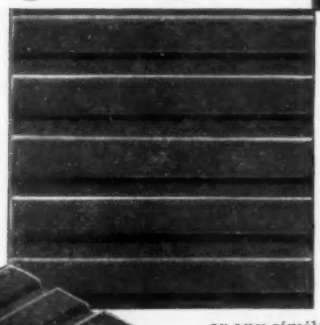
Typical Installations

FACTORIES
Traffic lanes, ramps, store rooms, loading bays.

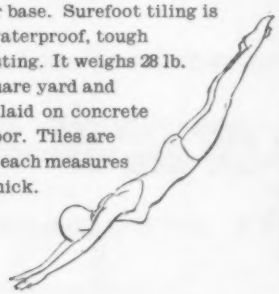
RAILWAY STATIONS
Booking halls, platforms, trucking ways, baggage rooms.

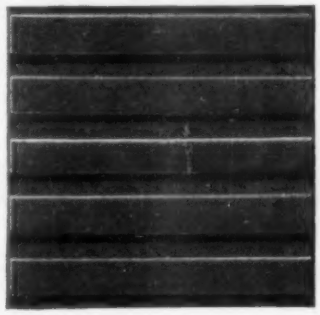
PITHEAD BATHS
Shower and changing rooms.

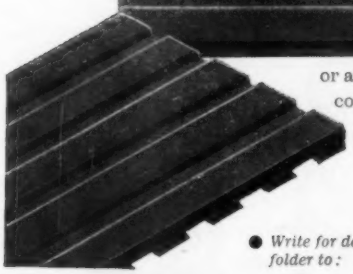
SWIMMING BATHS
Surrounds to pools and changing rooms.



Wet or dry . . . on the level or on the slope . . . Surefoot ribbed-rubber tiles form a robust yet quiet and resilient anti-skid surface. They may be laid as traffic lanes or as complete floor finishes. Besides being functional, the surface ribbing lends an attractive pattern to the floor. Dovetailed grooves on the underside of each tile ensure a firmly 'locked' setting in the mortar base. Surefoot tiling is fully waterproof, tough and lasting. It weighs 28 lb. per square yard and can be laid on concrete or any similar subfloor. Tiles are coloured black and each measures 18" x 18" x $\frac{3}{16}$" thick.







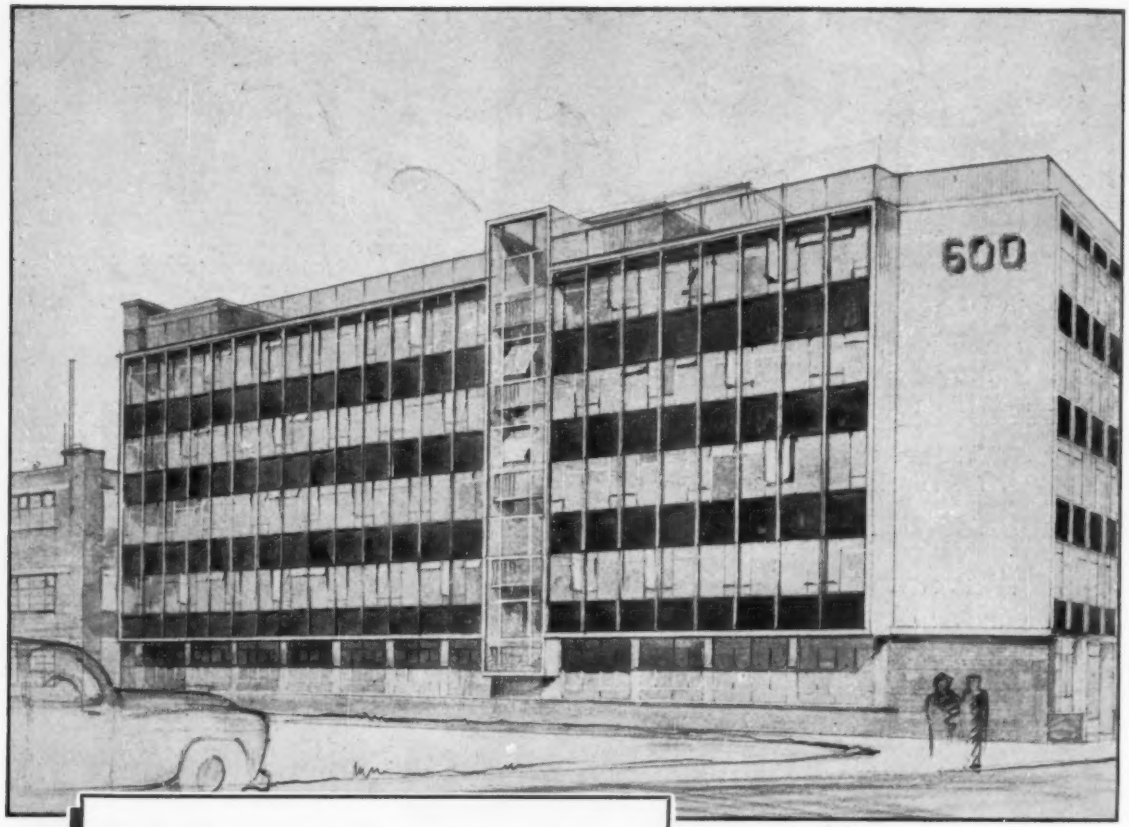
● *Write for descriptive folder to:*

SEMTEX LTD
THE FLOORING SPECIALISTS

● *A Dunlop Company*

SEMTEX HOUSE, LONDON, N.W.9
HENDON 6543

4 SE. PT. 1



600 GROUP OFFICE BLOCK, WOOD LANE, LONDON, W.12
MAIN CONTRACTORS, KYLE STEWART LTD.

A combination of

ARCHITECTURAL DESIGN AND ENGINEERING SKILL

The design by
Fitzroy Robinson & Hubert Bull,
B.A.(Arch), F.R.I.B.A.,
has been judged typical of the
finest contemporary building design
and was on view at this year's
Exhibition of the Royal Academy of Arts,
Burlington House.

The Reinforcement for
Retaining Walls, Basement, R. C. Frame
and suspended floors designed,
fabricated and fixed by:

T. C. JONES & CO. LTD.

REINFORCEMENT SPECIALISTS

Wood Lane, London, W.12 **Telephone: SHEpherds Bush 2020**
Reinforcement Department **17 Buckingham Palace Gardens, London, S.W.1 Telephone: SLOane 5271**
South Wales Office **Bute Street, Cardiff Telephone: Cardiff 28786**
Works **Shepherds Bush, London · Neasden, Middlesex · Treorchy, Glamorgan**

THE 600 GROUP OF COMPANIES

APPROVED:

NU-SWIFT

THE WORLD'S FASTEST AND MOST RELIABLE FIRE EXTINGUISHERS

APPROVED BY THE FIRE OFFICES COMMITTEE

Model 1301 Universal (Royal Navy) Extinguisher.....FOC Ref. No. 104/6 for Class A fire risks (*fires involving wood, paper, textiles and other carbonaceous substances*).

Model 1400 Air Foam Extinguisher.....FOC Ref. No. 104/3 for Class B fire risks (*fires on petrol, greases, oils, paraffin, white spirit and diesel oil*).

Model 1003 Auto (CTC) Extinguisher.....FOC Ref. No. 104/5 for Class C fire risks (*minor electrical risks and small petrol fires*).

Model 2003 Auto (Chloro-Flash) Extinguisher.....FOC Ref. No. 104/7 for Class B & C fire risks (*extra-hazardous fires involving spirits, alcohols, organic solvents and electrical equipment*).

All these models comply with British Standard specifications, where these exist. No British standards exist for chlorobromomethane extinguishers or double-action nozzles like that of the Universal extinguisher. But special FOC approval has been given to these Nu-Swift features because of their increased efficiency.

COMPLYING WITH BRITISH STANDARD CODE OF PRACTICE

(British Standard Code of Practice C.P. 402.401 (1951) is published on behalf of the Council for Codes of Practice for Buildings by the British Standards Institution.)

Universal (Royal Navy) Extinguisher Model 1301 for .. Class A fires
Air Foam Extinguisher Model 1400 .. .. .. Class B fires

ACCEPTED BY THE LONDON COUNTY COUNCIL

Consent granted under Sec. 20 of the London Building Acts (Amendment) Act 1930.

All Nu-Swift extinguishers that are approved by the Fire Offices Committee.

Why Nu-Swift are better:
Nu-Swift extinguishers are the only ones on the market to combine these essential advantages.

Immediate action—
instant pressure-charge operation eliminates waiting for a chemical action to build up pressure.

Quicker recharging—
all 2-gallon Nu-Swift extinguishers can be recharged and back in use in 30 seconds.

Standard System—
all Nu-Swift extinguishers are used in the commonsense upright position. There are distinctive colours for the models for different fire risks.

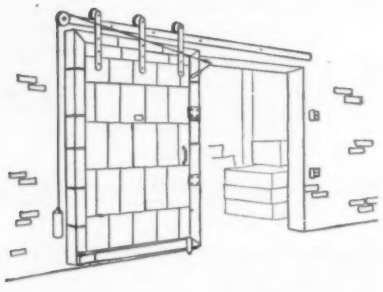
Greater reliability—
Nu-Swift pressure charges produce a pressure that is always exactly right for fire-fighting, never too great for safety. They do not leak, evaporate, or cause corrosion.

FOR EXTRA SAFETY IN BUILDINGS NEW AND OLD—SPECIFY NU-SWIFT EXTINGUISHERS

NU-SWIFT

Nu-Swift Ltd.,
25 Piccadilly, London, W.1
Telephone: REGent 5724
Telegrams:
NUSWIFT PICCY LONDON
Factory and Head Office:
Elland, Yorkshire
Telephone: Elland 2852
Telegrams: NUSWIFT ELLAND

Fire Resisting Doors



Wherever rooms are in communication with one another through doorways, or where floors are connected by means of stairways or lift wells, there are vulnerable points which demand protection against the passage of fire. All should be sealed by the fitting of efficient fire resisting doors.

The above photograph shows a Mather & Platt double-swing folding composite type fire resisting door with wired glass panels at the works of well-known pharmaceutical chemists.

Mather & Platt
LIMITED

Write for descriptive literature to:—

MATHER & PLATT LTD.
Park Works · Manchester, 10
Park House, Gt. Smith St., London, S.W.1

514

G.E.C. specifies BITUMETAL

Architects: G.E.C., WEMBLEY.

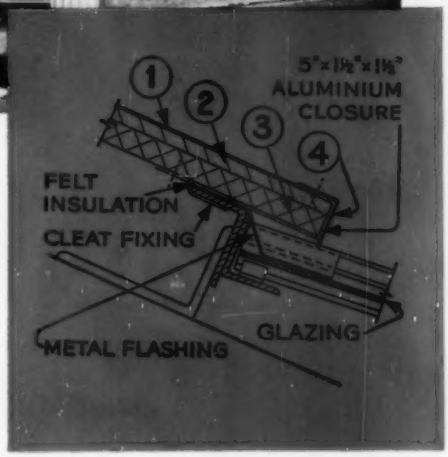
Vast enterprises have risen to pre-eminence through insistant concentration on one theme—"only the best is good enough."

It is natural therefore that THE GENERAL ELECTRIC CO. LTD. should choose the leaders in the field of roof covering to roof their new building at Ipswich.

"BITUMETAL" offers many advantages to Architects and Engineers. It combines in one unit, roof plus insulation plus ceiling—is thoroughly draught and dustproof and of neat and attractive appearance.

Briggs' Advisory Service is ready to save your time — by providing Roofing Technicians to advise in the planning stage—preparing complete working drawings and — supervising contracts from inception to completion.

Ask our nearest Area Office for more information.



1. Briggs 3 Layer Roofing with Green Mineral Cap Sheet.
2. ½" Insulation Board.
3. "BITUMETAL" Aluminium Deck (corrosion free).
4. Briggs Welted Roofing Drip.

Bright reflective ceiling.

No maintenance.

WILLIAM BRIGGS & SONS LTD.

VAUXHALL GROVE, LONDON S.W.8. REGD. OFFICE: DUNDEE

OFFICES AND DEPOTS ALSO AT ABERDEEN · BELFAST · DUBLIN · BRISTOL EDINBURGH · GLASGOW · LEICESTER · LIVERPOOL · NORWICH

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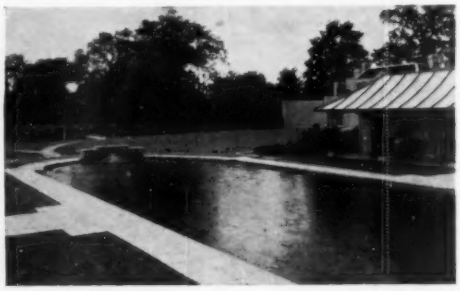
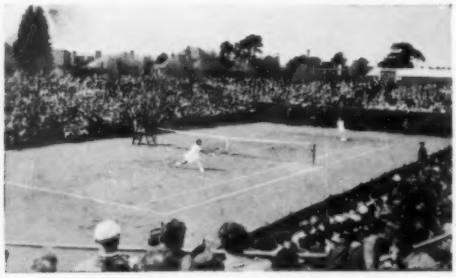


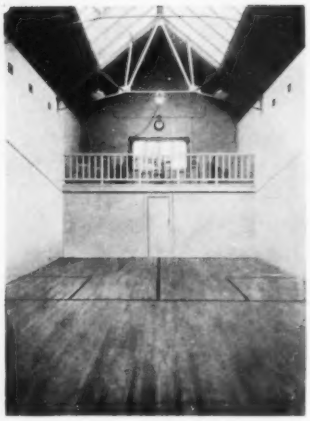


SWIMMING POOLS
(Open or Covered

SPORTS GROUNDS

Sole Agents for
'BITUTURF'
CRICKET PITCHES

SQUASH COURTS



HARD LAWN
TENNIS COURTS

Made by
EN-TOUT-CAS CO. LTD.
SYSTON, LEICESTER

Suppliers of
SPORTS GROUND EQUIP-
MENT and ACCESSORIES

S·W·
FARMER
& SON LIMITED

EST. 1898

FABRICATORS IN STEEL

IRON STAIRCASES STEELWORK BALUSTRADING

S.W. FARMER & SON LTD, COURTHILL ROAD, LEWISHAM, LONDON, S.E.13
'PHONE: LEE GREEN 4334-9.

3 BUILDING RATIONALITIES

Every year fuel costs rise. Coal costs more to hew, oil more expensive to transport.

Yet — houses are still being built in which high fuel consumption pours money into the atmosphere.

Car designers and owner-drivers are highly economy-conscious when it comes to fuel consumption; yet neither householders nor builders have hitherto shown sufficient interest in fuel economy in houses. The very man who congratulates himself on saving sixpence in petrol on his drive home from work, loses one and sixpence the same evening in heat loss from his house. Simple logic (and the purse) demands that we use the benefits modern scientific knowledge can provide towards greater comfort with economy in the home. Higher costs? Not a bit of it. By employing the maximum amount of factory-made insulating building components drier and warmer houses can be erected more cheaply. And fuel bills shrink.

BLUE HAWK products include:

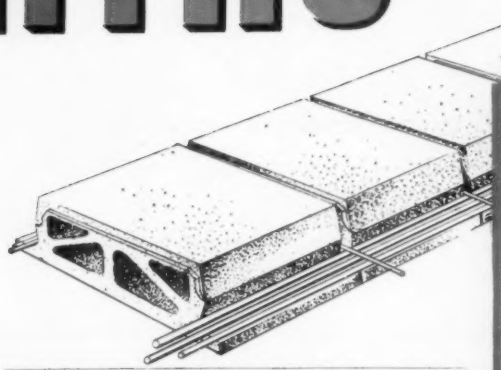
'THISTLE' *Plasters and Plaster Boards.* **'PARAMOUNT'** *Plaster Boards and Partitions.* **'PHARAOH'** *Browning and Wall Finish Plasters.*

Write for details of the full range of BLUE HAWK Insulating Dry Construction Linings.

THE BRITISH PLASTER BOARD (MANUFACTURING) LIMITED

BATH HOUSE, 82 PICCADILLY, LONDON, W.1. Tel.: GROsvenor 8311

SMITH'S FIREPROOF FLOORS



SMITH'S FIREPROOF FLOORS of Hollow Concrete Block construction are the result of considerable experiment and research to provide a floor LIGHT in WEIGHT but suitable for LARGE or SMALL SPANS, HEAVY OR LIGHT LOADING and able to sustain ABNORMAL POINT LOADS.

With this system of CROSS REINFORCEMENT, loads centred on small areas are distributed to the less loaded areas, thus eliminating abnormal strain in parts of the floor, which strain may cause serious cracking in ceilings and floors.

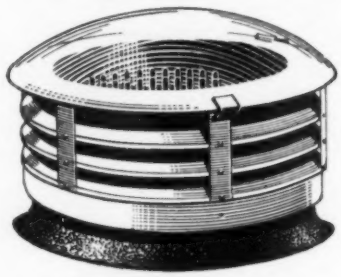
SFF JTD

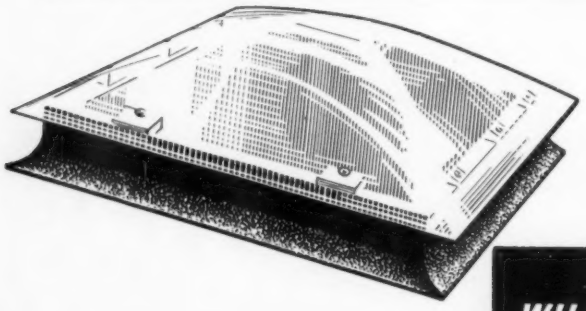
Midland Associated Company & Licensees,
PARKFIELD CONCRETE PRODUCTS CO. LTD.,
St. Peter's Road,
NETHERTON, nr. Dudley, Worcs. 'Phone Dudley 4315

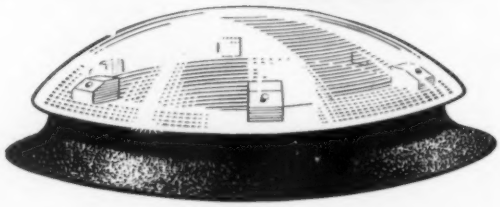
Two Way Reinforced Suspended Concrete Floors

SMITH'S FIREPROOF FLOORS LTD., IMBER COURT, EAST MOSELEY, SURREY. EMBerbrook 3300

"Perspex" DOME ROOFLIGHTS







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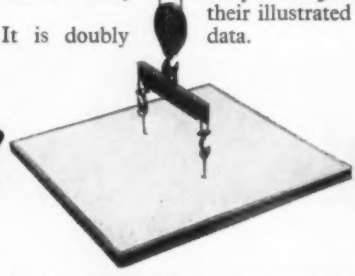

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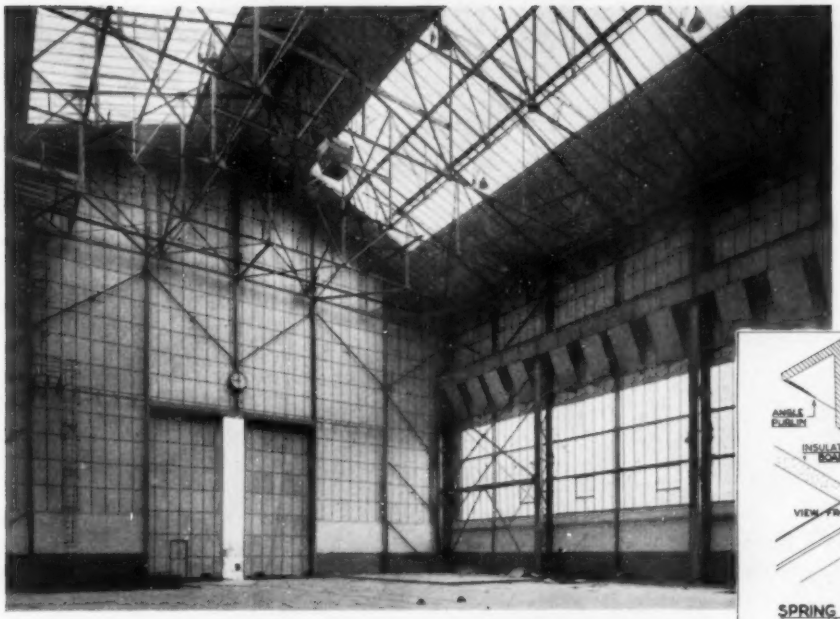

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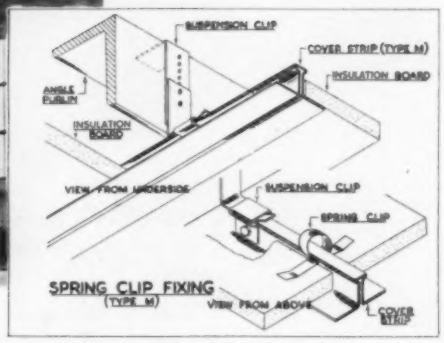

Architects : Messrs. Wylie Shanks & Wylie, Glasgow C.2.

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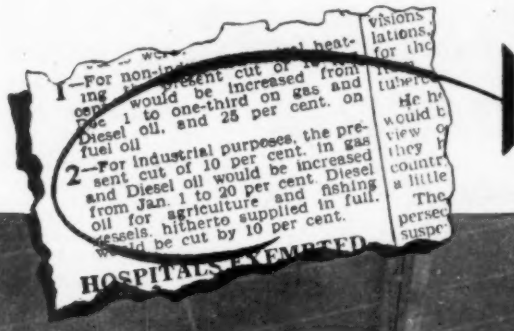
1—For non-industrial heating ... present cut or a reduction would be increased from one-third on gas and Diesel oil, and 25 per cent. on fuel oil
2—For industrial purposes, the present cut of 10 per cent. in gas and Diesel oil would be increased from Jan. 1 to 20 per cent. Diesel oil for agriculture and fishing vessels, hitherto supplied in full, to be cut by 10 per cent.
HOSPITALS EXEMPTED

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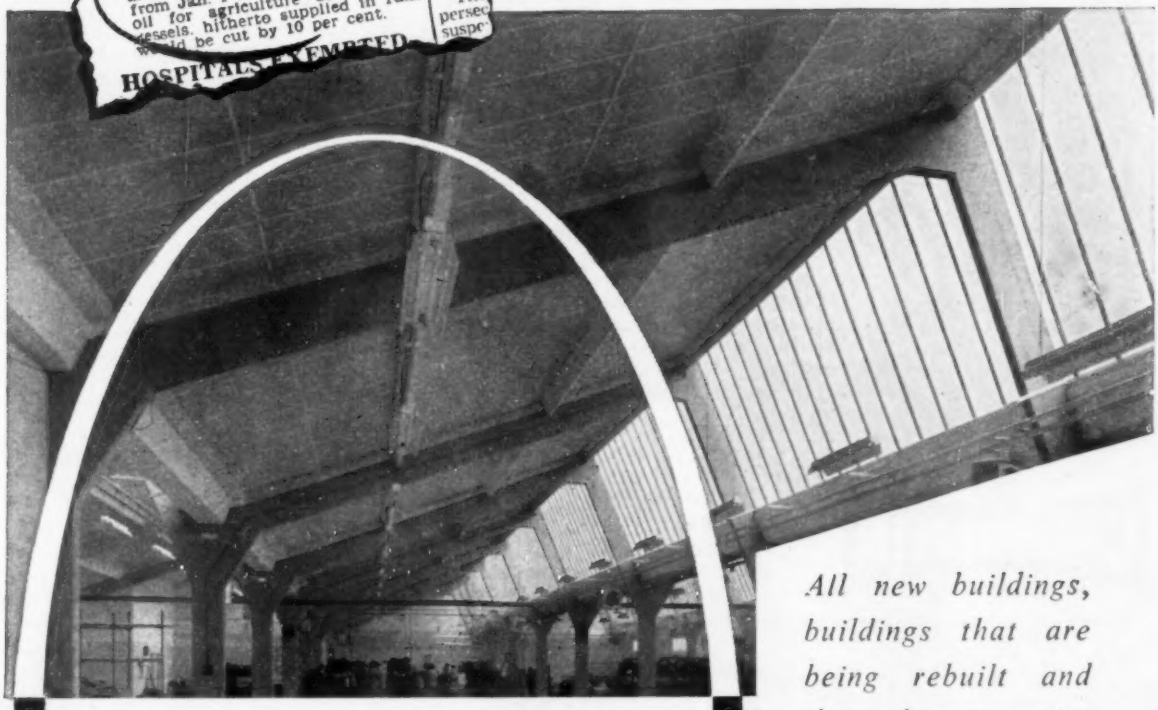

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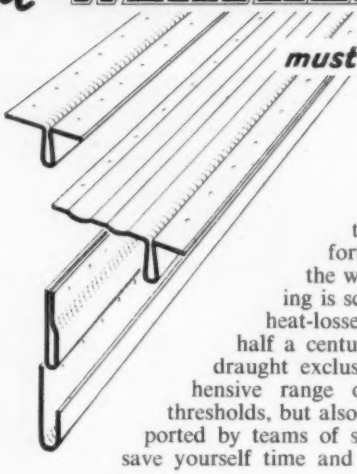

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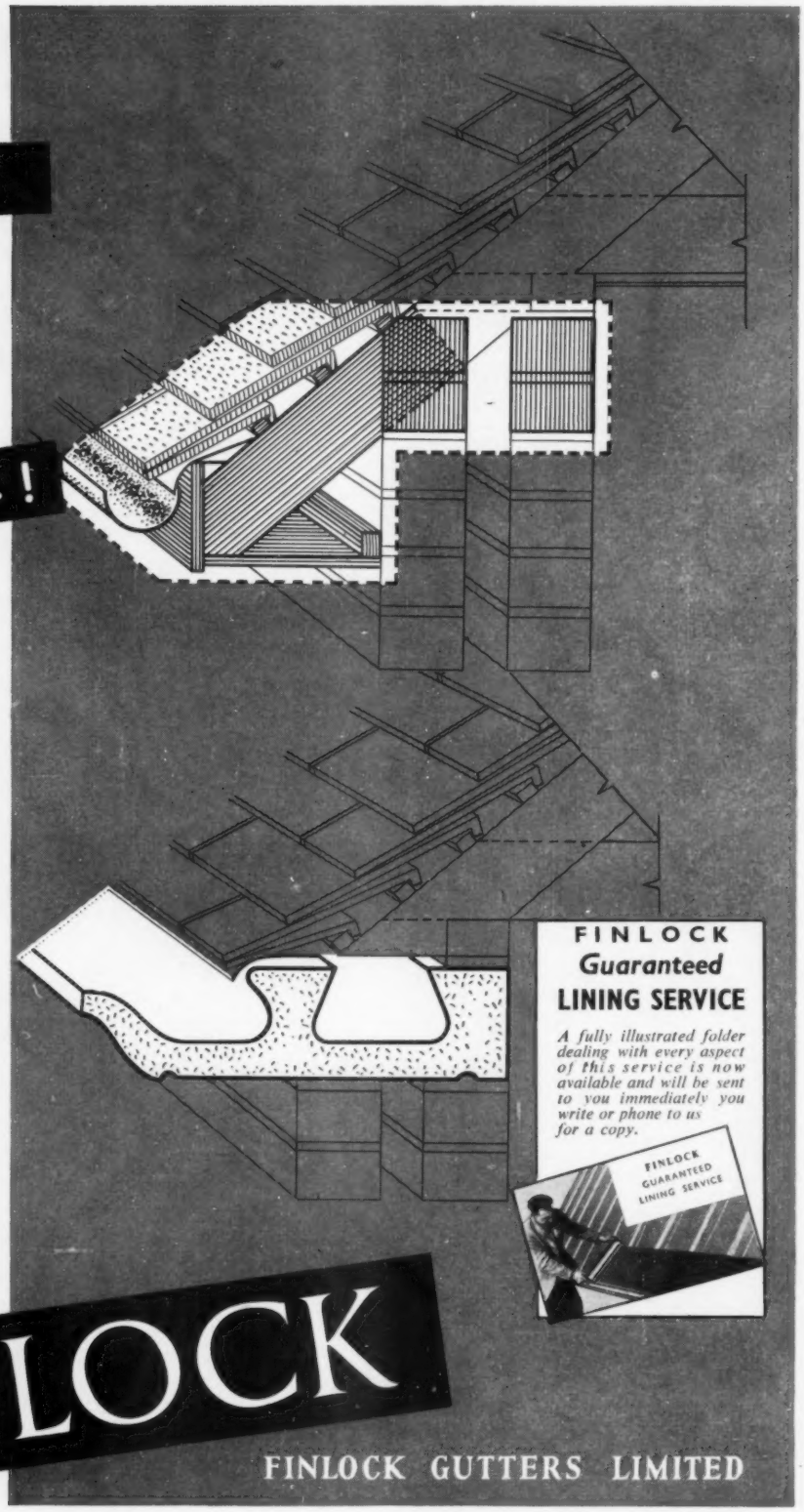

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Vol. 210 No. 25

THE ARCHITECT & BUILDING NEWS

December 20 1956

The "Architect and Building News" incorporates the "Architect" founded in 1869, and the "Building News," founded in 1854. The annual subscription, Inland and Overseas, is £2 15s. 0d. post paid; U.S.A. and Canada $9.00. Registered as a Newspaper.

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To all our readers—a very Happy Christmas. Photograph by Peter Westwood of Wieselstein, Austria

EVENTS AND COMMENTS

BUT ONCE A YEAR

The good cheer can I suspect be taken for granted, but coming this year on a Tuesday, Christmas is, as it were, back to front, and there will be little time to recover from the exertions of carving the turkey one day and patting the hounds at the local meet the next. However, we shall have no possible excuse for not putting the decorations up in time. Perhaps for once in a way we shall get to bed on Christmas Eve instead of Christmas Day. I suppose all those who work for someone else will have a holiday from Friday night till Thursday morning, while all those who work for themselves will have two days only. Those are the wages of success.

Whoever you are and whatever your category, even if you do no work at all, I wish you a very Happy Christmas.

MICHAEL VENTRIS MEMORIAL FUND

On another page you will find a letter which recently appeared in *The Times* over the signatures of a number of people distinguished in architecture and archæology. It announces the setting-up of a fund in memory of Michael Ventris. The object is to award a scholarship annually to a student of architecture and a student of archæology, alternately. This seems to me an excellent idea. I feel sure that all those very many who knew Michael Ventris will wish to subscribe. The Architectural Association is to administer the fund.

THE A.B.S. BALL

There is now no hall in London large enough to accommodate all who want to attend this Tamasha. The Great Room at Grosvenor House barely contained the crush of over eleven hundred souls last week. The dance floor had shrunk to a mere lawn tennis court, and anything in the shape of a Rock or a Roll was severely hampered by lack of heel room. This did not prevent the youngest and in some degree the oldest from cutting the rug. If that is the correct expression. Charleston, too, had its ritualists. I reflected that in the good old days when the Charleston was a new dance it was banned as being too rough for respectable night haunts, and that was before the introduction of steel cockspur heels.

The Ball should have made a lot of money, but charity or no charity it was rather unfair on the "patrons" to pack them in so. The band was lively, but did not appear to have learned many new tunes since last year.

The sideshows ably managed by devoted students and studentesses were well supported. The theme was, I believe something to do with automation—"archimation". The decorations were a bit swamped by the scale of the room, but there was plenty of animated automation on the floor.

I do not quite see what the organizers are to do next. Obviously they want to sell more tickets—I understand that there was a waiting list this year—but equally obviously they cannot allow any more than they had this year in the room. Supposing they were to organize a sweepstake, the prizes for which were tickets for the A.B.S. Ball. The numbers could then be limited to a comfortable 800, while the amount of cash—the tickets could be quite cheap—would be unlimited. Crazy? Well, it *is* the morning afterwards. Illegal? Ah yes, I was afraid so. Anyway, well done, the Ball Committee, we all enjoyed ourselves.

NEW ARCHITECT FOR CANTERBURY

Mr. John L. Berbiers, A.R.I.B.A., A.M.T.P.I., has been appointed Chief Architect and Planning Officer to the City of Canterbury. Mr. Berbiers, who was trained at Liverpool University School of Architecture and studied Town Planning at Manchester, is no stranger to these pages having contributed several articles on Planning, illustrated with his own drawings. Congratulations, sir!

NEW ATOMIC POWER STATIONS

Nuclear power stations are all the rage just now and my pictures show the three ordered last week. Groups of specialist firms have formed themselves into companies to undertake these tremendously complicated jobs. More about them next week.

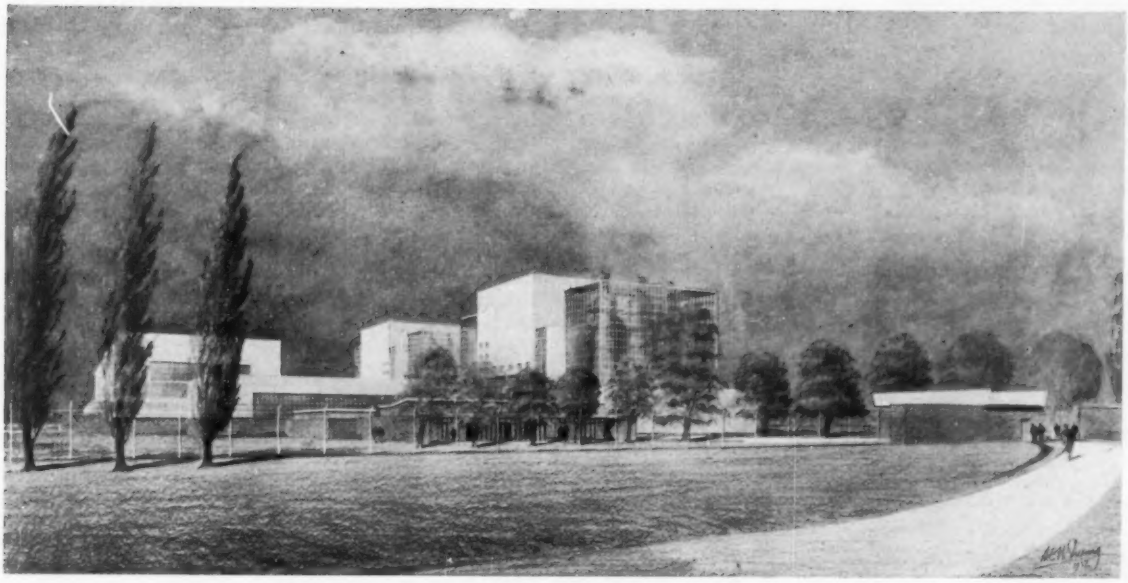
ARCHITECTURAL BENEVOLENCE

At this time of year calls on ones personal philanthropy are very heavy, they have seldom been more worthy or pressing than they are now. When some particularly important cause needs support there is a danger that the more permanent and less pressing causes may be overlooked. Please do not forget the A.B.S. Christmas Appeal. Mr. H. G. C. Spencely suggests in a letter on page 808 how architects might compute a suitable donation.

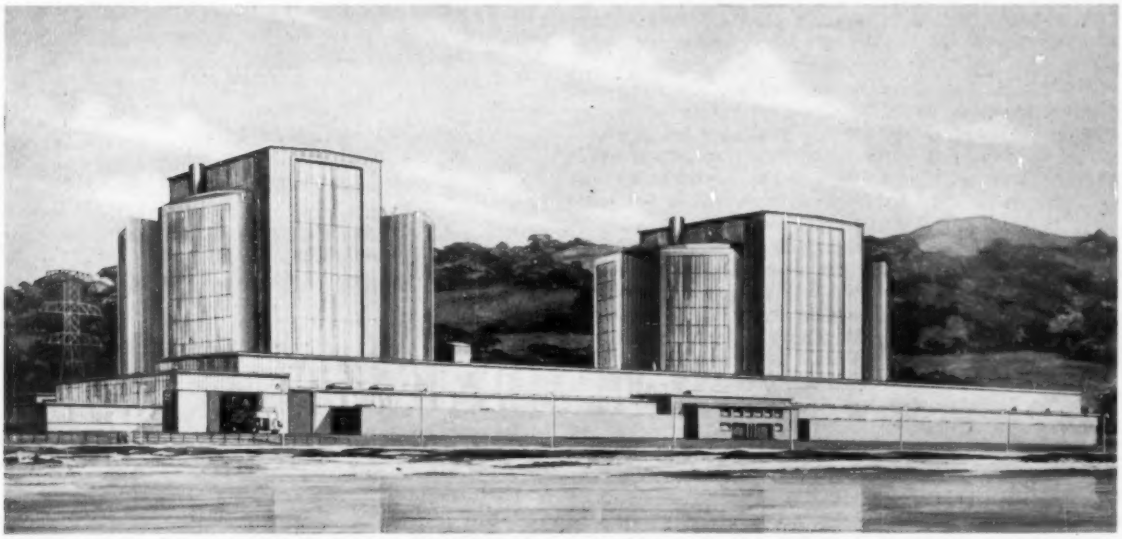
SCHOOL CURTAINS

The first exhibition at the Building Centre after Christmas is being organized by Gerald Holtom, the fabrics designer. Actual curtains from five schools will be shown. Mr. Holtom has supplied curtains to nearly 500 schools. The curtains to be shown include some "patchwork collages" where the decoration is cut out and applied to the background material. The schools represented will be Lyng Hall, Coventry (an appropriate name); Hurfield School, Sheffield; St. Alban's Primary School, Holborn; Burleigh Secondary Modern School, Hatfield; and Belper Secondary Modern School. The exhibition will be open from December 27 until January 8, 1957.

ABNER

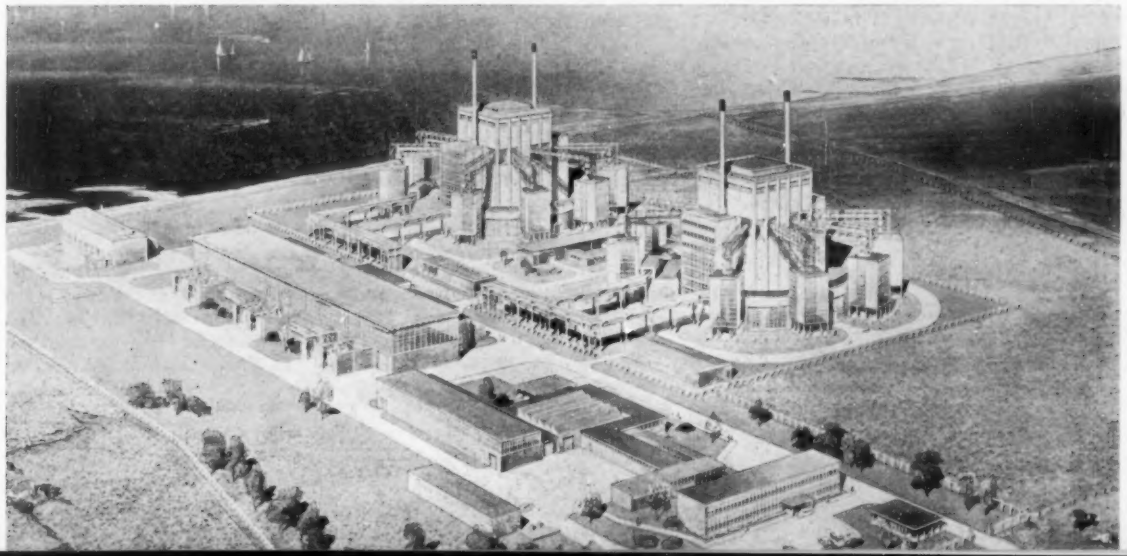


The nuclear power station at Bradwell, in Essex, which is to be built by the Nuclear Power Co.; consulting architect: Maurice Bebb



The G.E.C.-Simon Carves group has been awarded the contract to build this atomic power station at Hunterston in Ayrshire. The sketch is an artist's impression of the buildings from the design by Howard V. Lobb and partners, consulting architects

The third atomic power station contract to be awarded last Thursday was for one at Berkeley, on the Seven Estuary, to be built by the A.E.I.-John Thompson-Balfour Beaty-John Laing group. The consulting architect is Sir Giles Gilbert Scott



"They've had it"

Correspondence

Michael Ventris Memorial Fund

Sir,—Michael Ventris died at the age of 34, on September 6, 1956, in a motor accident. His discovery that the Linear B texts of Knossos, Pylos, Mycenae and other sites were Greek, ranks as one of the most brilliant achievements of scholarship and has been internationally acclaimed a feat of the same order as that of Champollion in deciphering the Egyptian hieroglyphs. The discoverer was awarded the Order of the British Empire by her Majesty the Queen, an Honorary Doctorate by the University of Uppsala, and an Honorary Research Associateship by University College, London. The brilliance of this discovery is matched by its importance and it will take years to work out the consequences of the new knowledge which proves that Mycenaean civilization was Greek speaking, gives us texts contemporary with and comparable with texts from the adjoining civilizations of Egypt and the Near East and shows us the state of the Greek language half a millennium before our earliest Greek literature.

Michael Ventris was trained and practised as an architect. To his profession he brought the same analytical brilliance that distinguished him as a classical scholar, and there lay ahead of him a career of exceptional promise. He had an uncanny gift for languages ancient and modern, and was fired to study the Linear B texts by a lecture given by Sir Arthur Evans which he heard when he was a schoolboy at Stowe. He was, moveover, a person of quite peculiar charm who was instantaneously loved by all with whom he came into contact.

We feel that many people will wish to join us in forming some memorial to his genius and personality. We hope that it may be possible to found a Michael Ventris memorial award or studentship, which would be open both to post-graduate students who were working on subjects connected with Mycenaean civilization and to students of architecture, because we feel that thus his two main interests would be represented. The fund would be used either for studentships or for grants and would be administered by a trust representing the two interests. Contributions should be made out to the Michael Ventris Memorial fund, and sent *either* to The Secretary, The Architectural Association, 34/36 Bedford Square, London, W.C.1, *or* to The Secretary, Institute of Classical Studies, 50 Bedford Square, London, W.C.1.

Yours etc.,

R. D. Barnett, Keeper of Western Asiatic Antiquities, British Museum. John Chadwick, Lecturer in Classics, Cambridge University. Kenneth M. B. Cross, President, Royal Institute of British Architects. Ifor Evans, Provost of University College, London. A. W. Gomme, President, Hellenic Society. Gontran Goulden, President, Architectural Association. Sinclair Hood, Director, British School at Athens. R. J. H. Jenkins, Chairman, Managing Committee, British School at Athens. R. Furneaux Jordan. John F. Lockwood, Vice-Chancellor, University of London. L. R. Palmer, Professor of Comparative Philology, Oxford University. N. Pevsner, Professor of History of Art, Birkbeck College, London University. Eric V. Reynolds, Headmaster of Stowe School. Torgny Segerstedt, Rector of Uppsala University. E. G. Turner, Director, Institute of Classical Studies. A. J. B. Wace, Emeritus Professor of Classical Archæology, Cambridge University. T. B. L. Webster, Professor of Greek, University College, London University.

To Help the A.B.S.

Sir,—Now that the present-giving season is getting near, may I suggest that every principal architect counts the number of new jobs which have come into his office since last Christmas, multiplies that number by his own factor (10s? 20s? or more?) and sends the proceeds to the Architects' Benevolent Society for the benefit of others less fortunate than himself?

If we could make such presents habitual, the heachaches and heartaches of the Architects' Benevolent Society would be considerably reduced.

Yours etc.,

H. G. C. SPENCELY.

New Zealand House

Sir,—May I correct one misconception to which the reports on this matter in your issue of December 6 may well have given rise? The panel of three—Sir Howard Robertson, Sir Edward Gillett and Mr. Minoprio—consulted by the Commissioners of Crown Lands did not, in fact, see the first design in the form illustrated in your article (i.e., of a height of 207—*not* 237—feet) but in a form rising to a height of 275 feet. The formula given by the Commissioners to the New Zealand Government before the preparation of the second design—namely, that it might be "in the contemporary idiom, with a tower, but paying due regard to the scale, the main architectural lines and the materials of the adjacent buildings"—was based upon the panel's advice.

Yours etc.,

R. M. J. HARRIS.

NEWS

Registered Housebuilders' Annual Dinner

Speaking at the first post-war annual dinner of the Federation of National Housebuilders which was held at Grosvenor last week, Mr. Harold Conolly, C.B.E., Vice-President, R.I.B.A., the Federation's guest of honour, said that the Federation had the active support of all kinds of organizations including the R.I.B.A., the R.I.C.S. and the local government associations, but it needed urgently to close its ranks. He said, "bring in those good boys who are not members, the sort of firms who are able to rely for their business on their good name and quality of work. . . ." "Bring in those bad boys and then cane 'em and make them conform to the standards you all conform to."

In his response to the toast, Mr. Setter, J.P., the newly-elected Federation's President said: "Housebuilders must be mindful of their responsibilities. The buying of a house is probably the largest investment the average person makes in his life". In Mr. Setter's opinion a house of good

and economical design could best be achieved by the combined brains of the architect and builder, not forgetting to let the housewife have her say.

Mr. Frank Russon, immediate Past-President proposed "the guests"; the response was by Mr. Fred Bently, Chairman of the Building Societies' Association.

F.A.S. Branch in Australia

At the Council Meeting following the annual general meeting of the Faculty, Mr. Godfrey S. Agar was elected President for the ensuing year.

Proposing the toast of "The Faculty of Architects and Surveyors" at the Faculty's annual dinner recently, Mr. Dimmitt, Agent-General for Western Australia, said that he had been much interested to learn that a group of the Faculty had been established in Perth, Western Australia, which was the city he came from. He was especially pleased that the extension of the Faculty's activities had been largely concentrated in Commonwealth countries.

Touching upon the laws governing architects and surveyors in Western Australia, the speaker said that the Act of Parliament, which enabled architects to form their body was assented to on January 31, 1922. From that time architects were registered, and practised their profession under the auspices of the Institute of Architects, now the Royal Australian Institute of Architects, under the Western Australian Chapter.

Appointment

H. E. Buteux, A.R.I.B.A., A.M.T.P.I., has recently been appointed Principal Architect (Housing) in the City Architect's Department, Birmingham.

Professional Announcement

Hugh Wilson, O.B.E., A.R.I.B.A., A.M.T.P.I., Chief Architect and Planning Officer to the Cumbernauld Development Corporation has now opened his office at Cumbernauld House, Cumbernauld, Dumbartonshire, and will be pleased to receive trade catalogues and samples. Representatives by appointment only at present.

Law and Administration

Tents, Vans and Sheds

In the last few years the Ministry of Housing and Local Government have been making considerable efforts to bring the system of local authority by-laws into order and up to date. To this end they have been issuing from time to time *Model By-laws* in a form suitable for adoption by local authorities. The most recent of this sequence is Series XVII which deals with Tents, Vans, Sheds and similar structures. These are intended to be made by local authorities where appropriate, in pursuance of their powers under Section 268(4) of the *Public Health Act*, 1936. If these by-laws are made they will affect these structures when they are used for human habitation and should ensure that certain minimum standards of health precautions are observed and will make failure to observe these standards an offence.

The Ministry point out that, so far as camping is concerned the local authorities already can exercise control by means of licences issued under Section 269 of the *Public Health Act*, 1936. It should be added that the term camping includes more than mere casual tentage. Licences under this section are for "moveable dwellings" which "includes any tent, any van or other conveyance whether on wheels or not and . . . . . any shed or similar structure, being a tent for conveyance or structure which is used either regularly or at certain seasons only, or intermittently, for human habitation . . . . ." The local authority must therefore take care to avoid inconsistencies, as well in theory as in practice between the operation of their licensing powers under Section 269 and any by-laws they may make under Section 268(4).

In Parliament

Central London Conflict

Mrs. Jeger, returning to the charge about residential accommodation in central London, asked the Ministry of Housing and Local Government what proposals he had and if he would refuse consent to further business and commercial building in the central area. Mr. Duncan Sandys told her that it was in order to reduce congestion that he modified the County of London Development Plan so as to increase the area allocated for residential use and to restrain the spread of commerce in the central areas. Since then he had missed no opportunity of stressing the importance of these questions. He was hoping shortly to receive from the London County Council and the City Corporation proposals for further measures to relieve congestion.

Mrs. Jeger expressed appreciation of what the Minister had done, but claimed that there were indications that office building in central London was already excessive—as could be seen from the number of advertisements for office space to let. She asked the Minister definitely to refuse his consent to any further business or commercial building, at least for the time being. Mr. Sandys: It is not so easy. It really could not be realistic to put a ban on all further commercial building in what is after all the principal commercial centre of this country. Apart from whether it would be wise to do so, the compensation involved would run into fantastic figures. That must be borne in mind. But he was doing what he could to keep additional commercial building within bounds. (Dec. 11.)

Development Area Factories

Mr. Willey questioned the President of the Board of Trade about policy on factory building in the Development Areas, and complained that there was a general feeling that this was at an absolute standstill. Mr. Thorneycroft was prepared to agree that there had been economy exercised in Government building in the Development Areas. Mr. Willey argued that if there was a general slow-down in building there was a particular need for a development policy, and he expected the Minister to promote and encourage more building activities in the Development Areas. Mr. Thorneycroft insisted that all forms of Government expenditure must be closely watched, and this was an expenditure which could not altogether escape attention. (Dec. 11.)

Historic Buildings Survey

The Minister of Housing and Local Government told Dr. Stross that out of 1,480 local authorities' areas 1,071 had been surveyed for buildings of special architectural or historical interest. Lists had been issued in respect of 1,177 (including interim lists), but he could not forecast when the work would be completed. Dr. Stross urged that it was time the work was finished, and asked the Minister to see that it was expedited. Mr. Sandys said that he would, within reason, but there was a fearful amount of work involved and it did inevitably take time. (Dec. 11.)

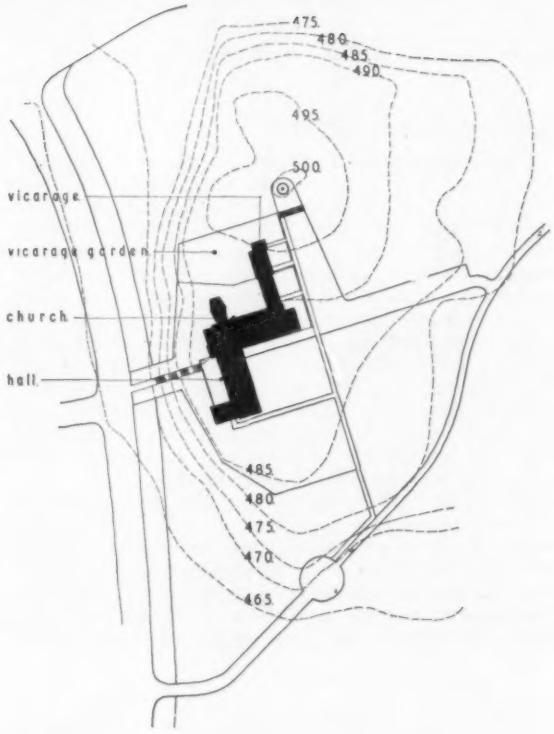
The Interior of the nave

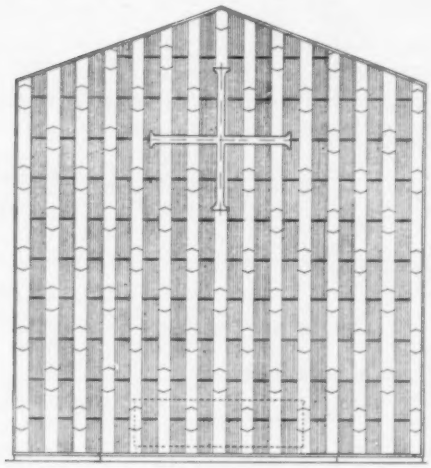
EMMANUEL CHURCH BENTLEY

Architects :
LAVENDER, TWENTYMAN & PERCY

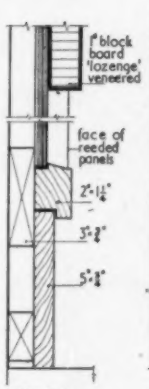
THIS church, hall and vicarage were built to serve a newly developed area lying between Walsall and Willenhall. The surroundings had been levelled, leaving a high mound for the church site. Pedestrian access is by a flight of steps leading up the western slope of the mound, while a road for vehicles leads up to a car park on the east side of the building.

There is a cairn on top of the hill commemorating the site of Bentley Hall where Charles II stayed during his flight after the battle of Worcester, and it was necessary to incorporate this cairn in the layout.

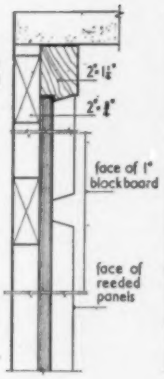




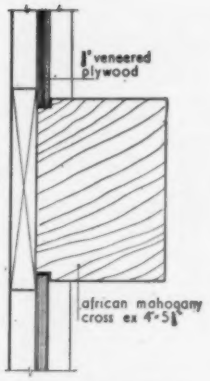
ELEVATION OF EAST WALL



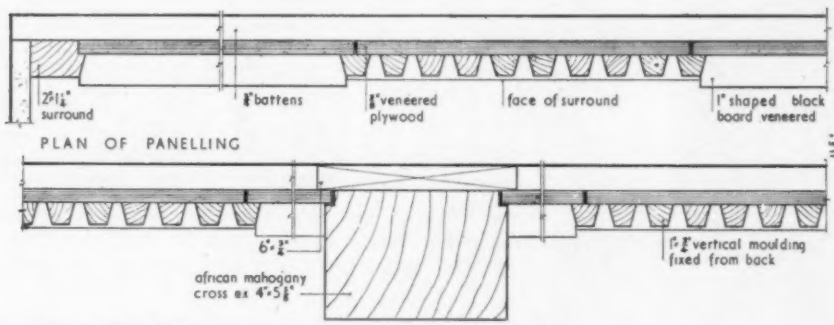
SECTION AT FLOOR



SECTION AT CEILING

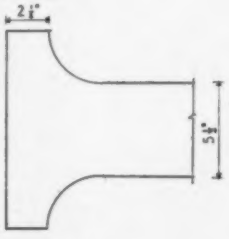


SECTION THROUGH ARM OF CROSS



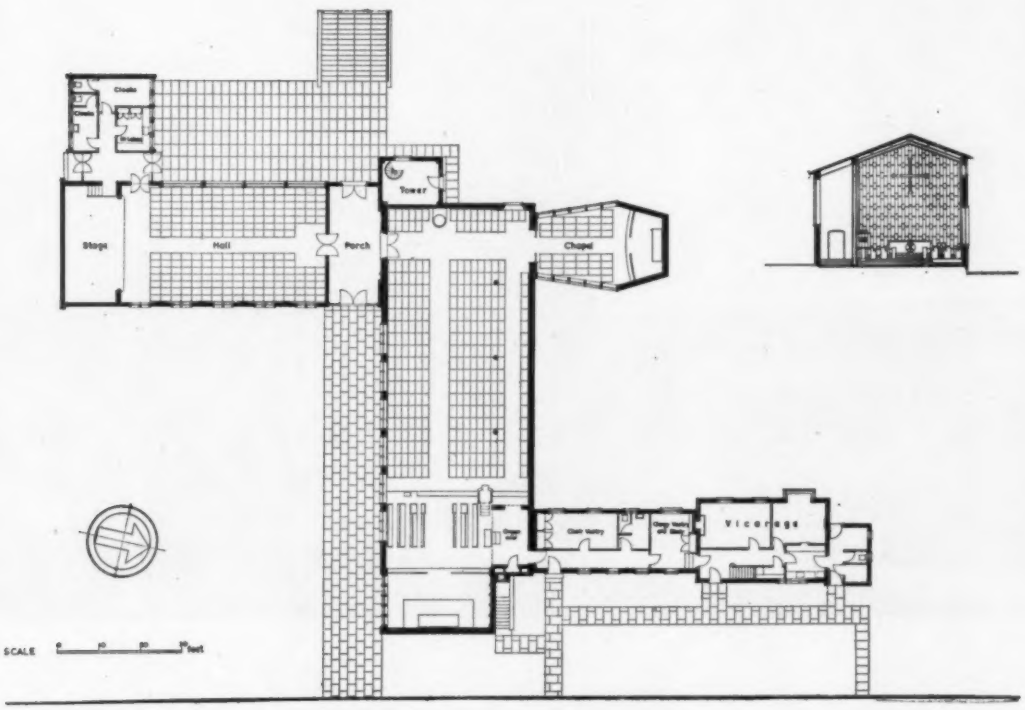
PLAN OF PANELLING

PLAN OF CROSS

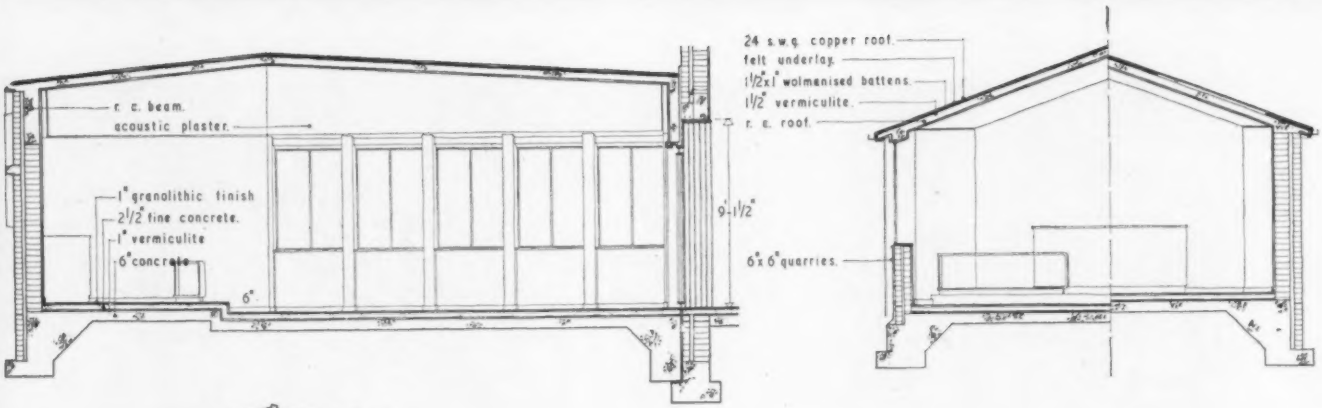


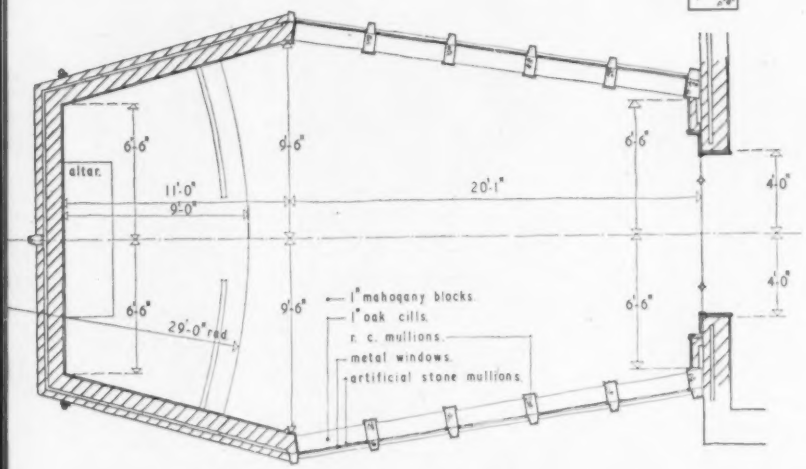
DETAIL OF CROSS

Above, details of the east end wall. Scale : 1in = 10ft and 1/5th full size



PLAN & SECTION SCALE: 1 IN = 40 FT



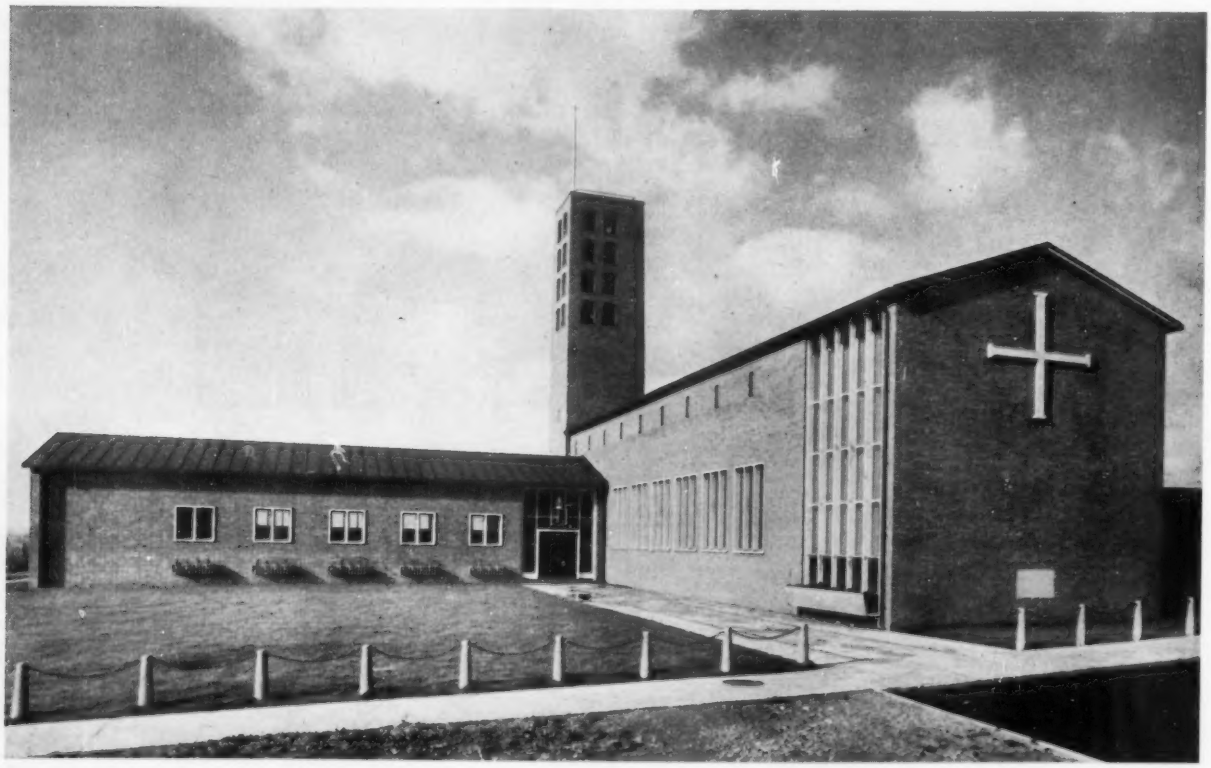


PLAN AND SECTIONS OF CHAPEL. SCALE: 1 IN = 8FT

EMMANUEL CHURCH BENTLEY

Sub-contractors :

Asphalt Roof to tower : The Limmer & Trinidad Lake Asphalt Co. Ltd. *Bells :* John Taylor & Co. *Electrical Installation :* W. H. Podmore Ltd. *Flooring (Woodblock and Semastic) :* J. A. Hewetson & Co. Ltd. *Garden Layout :* D. N. D. Hoddy. *Heating Installation :* G. N. Haden & Sons Ltd. *Ironmongery and Wrought Metalwork :* James Gibbons Ltd. *Lath to aisle ceiling :* Colterro Ltd. *Ladders (Steel) :* Steelway Ltd. *Lightning Conductor :* W. J. Furse & Co. Ltd. *Organ :* W. Hawkins & Son. *Reinforcement and Concrete Design :* Twisteel Reinforcement Ltd. *Roofing (Copper) :* (To Church & Chapel) Holloway Metal Roofs Ltd. ; (Remainder) Broderick Insulated Structures Ltd. *Sanitary Fittings :* A. D. Foulkes Ltd. *Slate and Marble :* W. H. Fraley & Sons Ltd. *Spiral Stair :* Steelway Ltd. *Stone (Cast) :* Gloucester Stone Co. Ltd. ; *(Painswick):* The South Western Stone Co. Ltd. *Windows (Metal) :* James Gibbons Ltd.



Planning

The main porch is entered from both east and west sides and serves the hall as well as the church. The vicarage is placed on the north side, connected to the church by the vestry block; the clergy vestry also serves as the vicar's study.

The church seats 296 in the nave, 30 in the choir and 38 in the chapel, a total of 364. The hall seats 226.

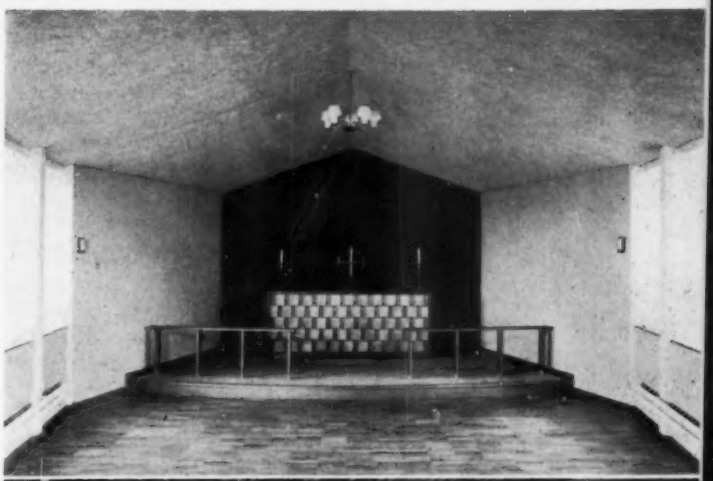
The church is planned with one aisle on the north side, not normally used for seating, but useful as an overflow on special occasions. Fairly low windows are provided in the south side, to avoid excessive heat in summer, while the north side has a long range of high windows. Deep mullions are used to diffuse the light and reduce glare.

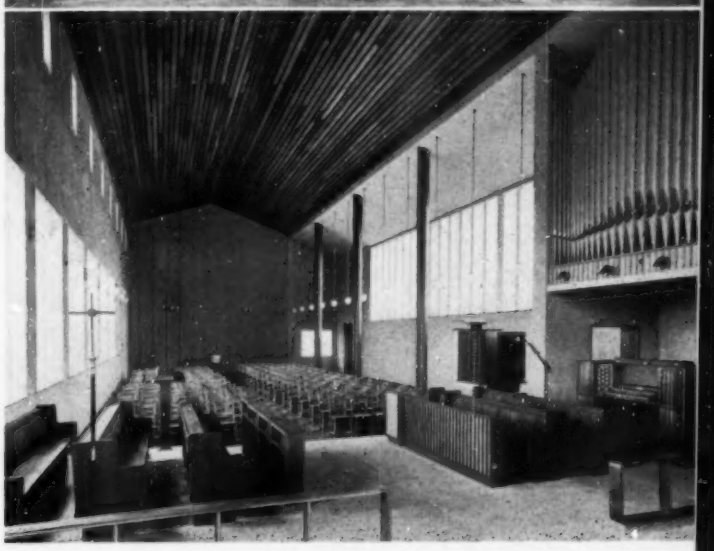
The 70ft-high tower contains four bells; the south wall is vertical, the north wall has a batter of 1in in 4ft and the east and west walls a batter of 1in in 18ft.

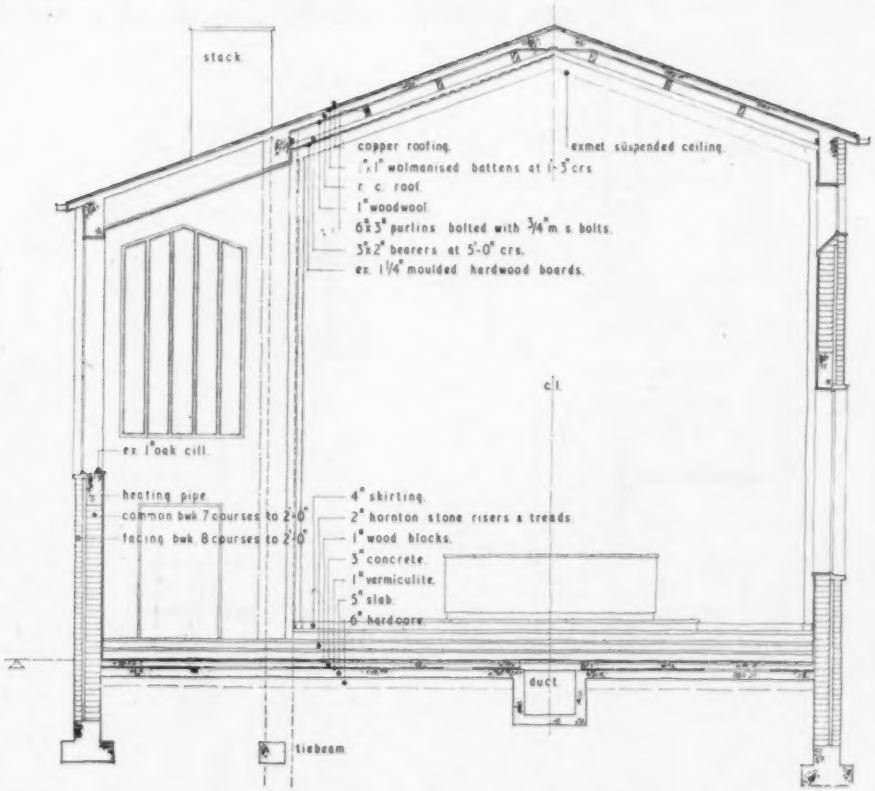
Construction

The church has a reinforced concrete frame with piers at 18ft centres supporting a concrete roof consisting of two 4in thick inclined slabs. There are no trusses or ties, the outward thrust of the roof being resolved by triangular beams in the gable ends. There are three 12in diameter cruciform-shaped concrete columns between nave and aisle, to reduce the span of the north roof slab. The walls between columns are of cavity brickwork and the roof is lined with woodwool

Quantity Surveyors :
HENRY VALE & SON
General Contractors :
HENRY WILLCOCKS & CO. LTD.







Top right, the interior of the chapel. Below, the interior of the nave. On the right, a section through the nave, scale: 1in = 8ft. Facing page, an exterior view of the whole church group from east

D

EMMANUEL CHURCH, BENTLEY

slabs. The tower is of simple concrete frame construction, faced with brick and with slate louvres in the openings.

The chapel has a similar type of roof to the church except that the ridge slopes to suit the plan shape.

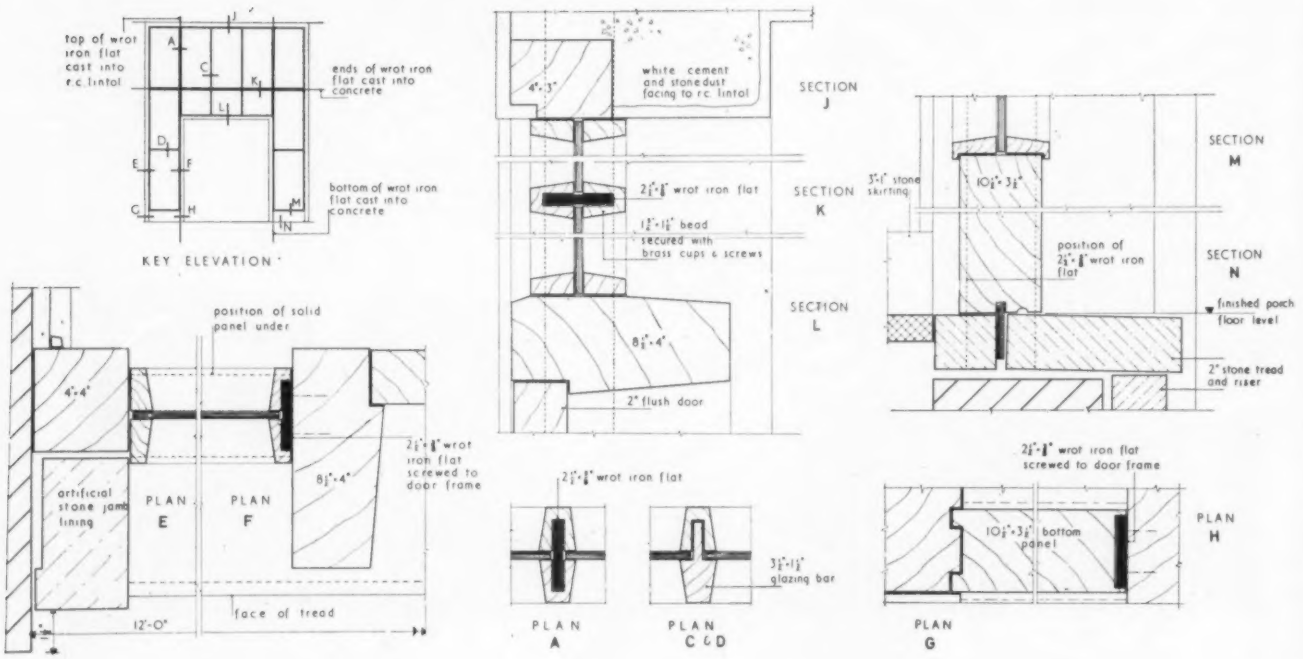
The hall has load-bearing brick walls, except where there are steel stanchions between the big windows, steel roof trusses and purlins supporting timber rafters and insulating board. The vestry block and the vicarage have load-bearing brick walls and timber roofs. Settlement joints are provided between church and vestry block, and between church and hall.

Finishes

The walls are faced with handmade golden buff bricks and roofs, gutters and downpipes are of copper. The concrete window mullions are faced with cast stone and spandrels between, where they occur, are faced with Welsh slate. Bronze wall-ties and cramps were used throughout. The Diocesan shield over the main doors is of aluminium, painted.

Church: the nave floor is of Sapele blocks and the sanctuary floor of Hornton Stone. North and south walls are finished in a rough textured plaster coloured pale grey, contrasting with smooth white plaster round windows. The west wall is faced with perforated hardboard, painted grey-green, with glass-silk behind; the east wall is panelled with a pattern in reeded walnut and walnut-veneered blockboard. The nave ceiling is of slightly fluted African walnut boards with slots between for acoustic absorbence. Other joinery

Above, the doors into the porch. Below, details of the doors and screen, scale: 1/6th full size



generally is in African mahogany. The chapel has similar finishes except that the ceiling is of acoustic plaster, sprayed pale blue.

Porch: this has a floor of Hornton Stone and Welsh Slate and the wall surrounding the doors to the church is faced with Painswick Stone. Other walls are of rough textured plaster, painted green.

Remainder: the hall has a floor of Opepe blocks, plastered walls, and ceiling of insulation board. The vestries have thermoplastic tile floors and plastered walls and ceilings. The vicarage has normal domestic finishes.

Heating

The church heating is by invisible panel warming in the floors, which are of a sandwich type with a vermiculite layer in the middle. Auxiliary heating by electric tubes is provided in the chapel, so that it can be warmed up quickly for week-day services.

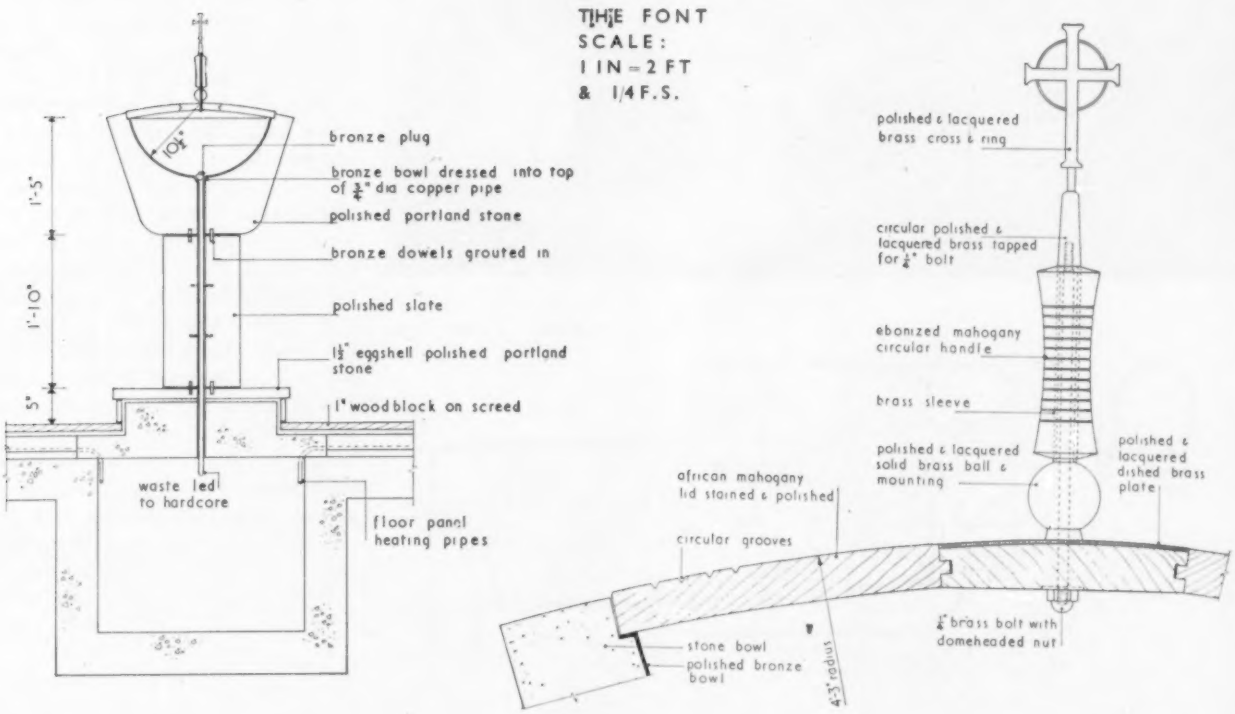
The rest of the buildings are heated by radiators, supplemented by blower heaters in the hall. All heating is from a boiler-house, below the sanctuary, containing an oil-fired boiler.

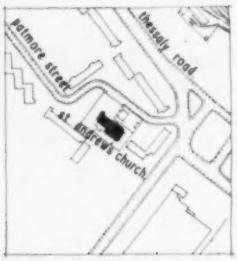
Cost

The contract figure for the church, including tower, bells and all furniture except movable chairs was £25,054, excluding the organ.

The figure for the three buildings was £39,793, including the external flight of steps, paths, etc.

The doors from the porch into the church itself





ST. GEORGE AND ST. ANDREW'S CHURCH, BATTERSEA

Architects: COVELL & MATTHEWS

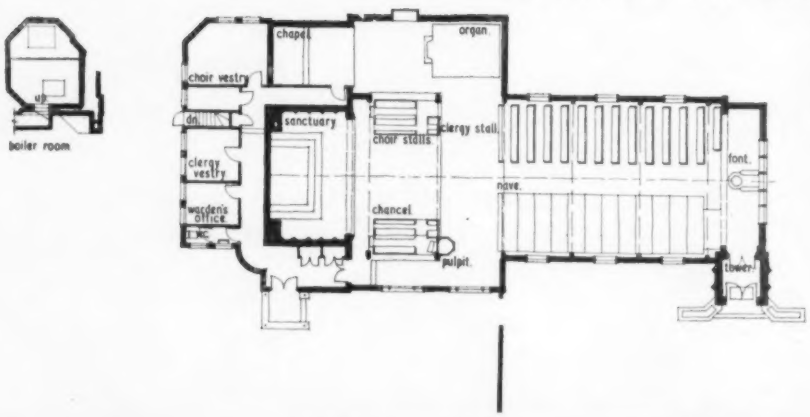
Quantity Surveyors: SMITH & BOWL

General Contractor: HUMPHREYS LTD

Sub-contractors:

Electrical Contractors: B. French & Co. Ltd. *Facing Bricks:* Broad & Co. Ltd. *Fittings:* Holliday & Greenwood Ltd. *Glazing other than Stained Glass:* Leay Glazing. *Heating Engineers:* A. Smith & Son. *Ironmongery:* A. G. Roberts Ltd. *Lightning Conductors:* W. J. Furse & Co. Ltd. *Organ:* Kingsgate Davidson & Co. Ltd. *Paint:* Mander Bros. Ltd. *Reconditioning of Bell:* Mears & Stainbank. *Stained glass windows designed and executed by:* W. T. Carter Shapland. *Structural Frame:* Orlit Ltd. *Thermoplastic Tiles:* Limmer & Trinidad Lake Asphalt Co.

PLAN SCALE: 1 IN = 32FT



THIS Church replaced the superstructure of the original St. Andrew's, Battersea, which was severely damaged by enemy action, the damage being deepened later when the whole area became a designated street fighting area. Immediately after the war, the roof, of what was then only a shell, was burnt off in a civil fire. It was decided to use the War Damage Commission's Church Payment to rebuild the whole superstructure, but to use the existing foundations which had not been damaged.

The construction consists of a system of ground beams to unite the original old piers and to provide a safeguard against local weaknesses. Off the ground beams a reinforced concrete portal frame system by Messrs. Orlit Ltd., was erected, the non-load-bearing panel walls being of 11in cavity brick construction. The sanctuary tower was built up in a reinforced concrete frame with a skin of brickwork externally and internally, so as to reduce the load imposed upon the existing foundations at the east end. The facing bricks externally are Heath's Multi-Colour Wire Cut, supplied by Messrs. Broad & Co. Ltd., and are employed entirely unplastered but distempered. The ceiling is formed of Celotex Highlight Finish Boarding secured to a timber framework, and in turn to the Orlit reinforced concrete purlins and roof. Roof covering is of Italianized Zinc, i.e., sheets with

pre-formed rolls. The tower steeple is, however, covered in copper. Heating is by low pressure hot water, there being an oil-fired thermostatically controlled boiler including automatic gear to produce a trickle of heat when below-zero temperatures occur.

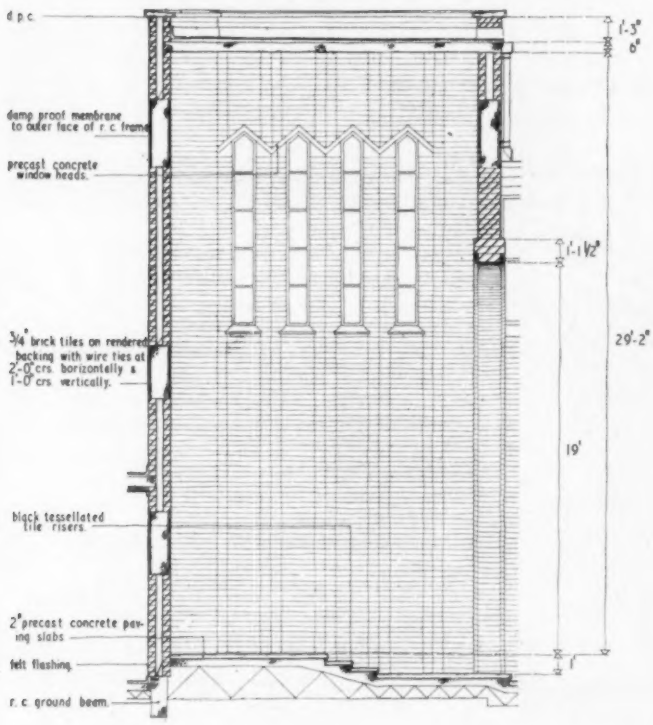
The churchmanship is Evangelical and the sanctuary arrangements were required to be kept as simple as possible. The church is known as St. George and St. Andrew, because the parish now incorporates the parish of St. George with that of St. Andrew as a united benefice.

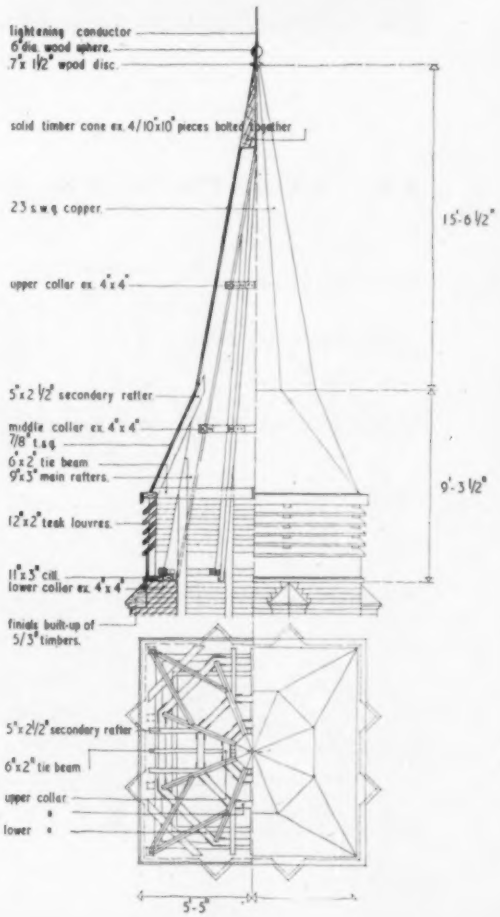
The stained-glass windows which form a notable feature of the church comprise five lights on the north side based on the story of Bunyan's *Pilgrim's Progress*, and on the south side depict St. Andrew and St. George, with a third window showing Bunyan imprisoned, and so inspired to write his great work. The sanctuary window shows Christ in glory with the Apostles and in the flanking lights the Symbols of the Passion.

The need for economy dictated the re-use of a large number of old fittings, including the pews from St. George's Church.

Continued overleaf

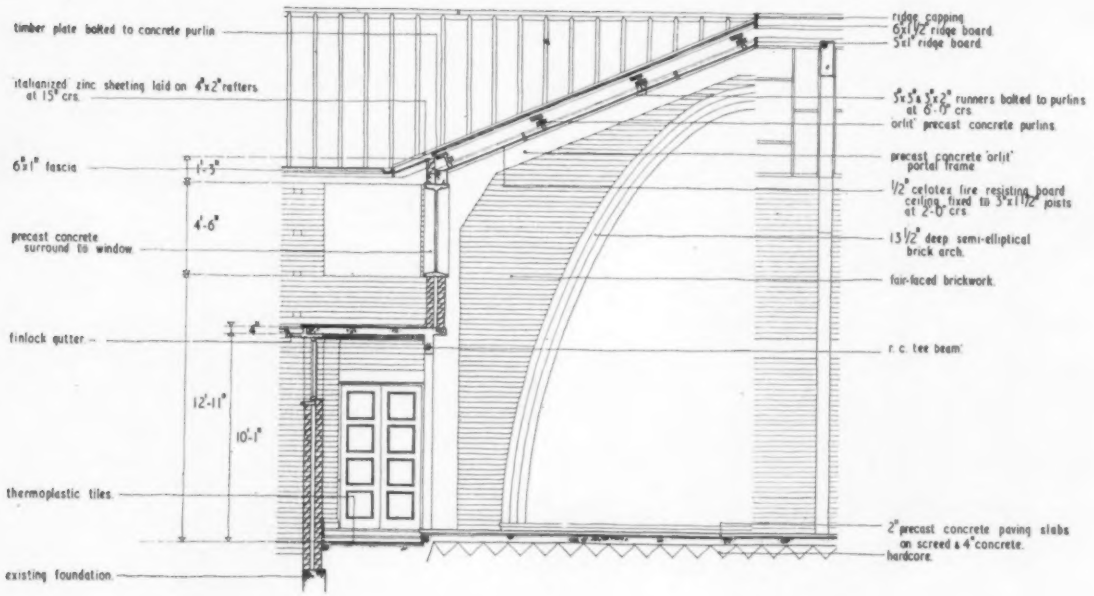
Top of the page, one of the stained-glass windows designed by W. T. Carter Shapland. Below, details of the sanctuary and the spire, sca =8ft

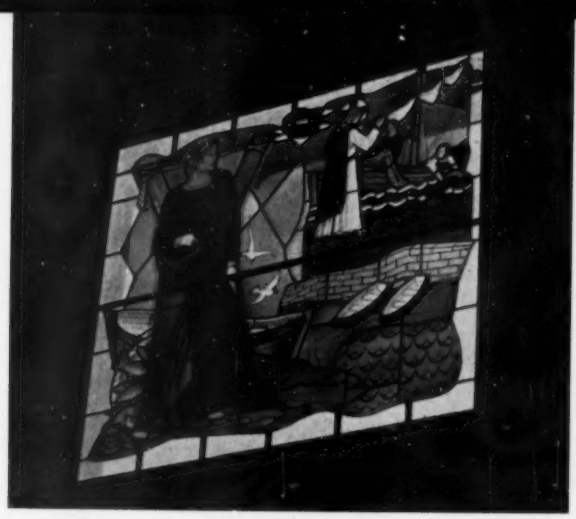




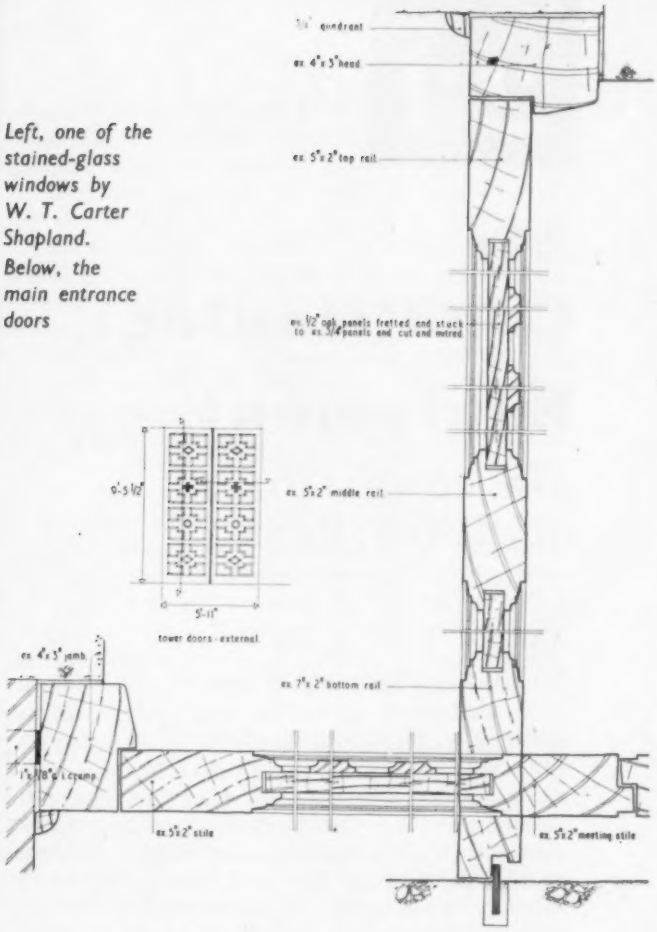
Interior of the nave, looking towards the sanctuary. Below, section through the nave, scale 1in=8ft

ST. ANDREW'S CHURCH, BATTERSEA

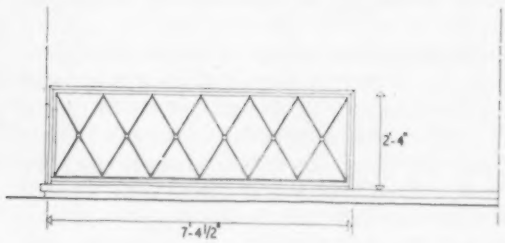

timber plate bolted to concrete purlin
galvanized zinc sheeting laid on 4"x2" rafters at 15" crs.
6"x1" fascia
precast concrete surround to window
finlock gutter
thermoplastic tiles
existing foundation
1'-3"
4'-6"
4"
12'-11"
10'-1"
ridge capping
6"x1/2" ridge board
5"x1" ridge board
3"x3"x3"x2" runners bolted to purlins at 8'-11" crs.
orlit' precast concrete purlins
precast concrete 'orlit' portal frame
1/2" celotex fire resisting board ceiling fixed to 3"x1/2" joists at 2'-0" crs.
13 1/2" deep semi-elliptical brick arch.
fair-faced brickwork.
r. c. tee beam
2" precast concrete paving slabs on screed & 4" concrete.
hardcore.

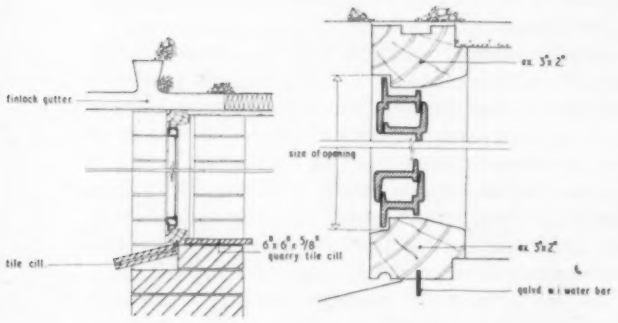


Left, one of the stained-glass windows by W. T. Carter Shapland. Below, the main entrance doors

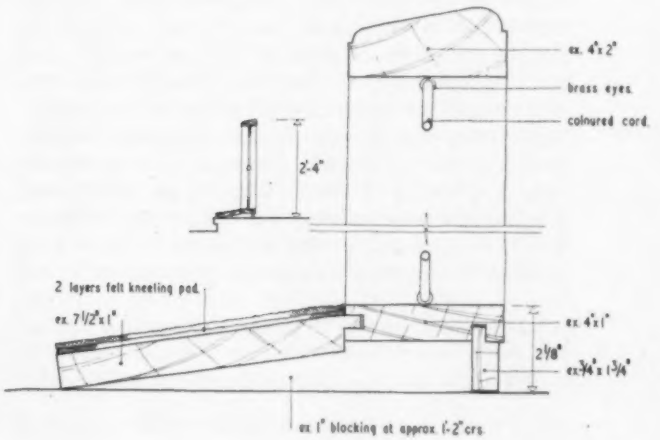

ex 4"x 5" head
ex 5"x 2" top rail
ex ½" oak panels fretted and stuck to ex ¾" panels and cut and mitred
9'-5½"
ex 5"x 2" middle rail
5'-11"
tower doors - external
ex 4"x 5" jamb
ex 7"x 2" bottom rail
1"x 7/8" s.c. cramp
ex 5"x 2" stile
ex 5"x 2" meeting stile

Above, details of the entrance doors, ¼ full size





Above, metal window details ¼ full size. Right, altar rail Scale : ¼ full size

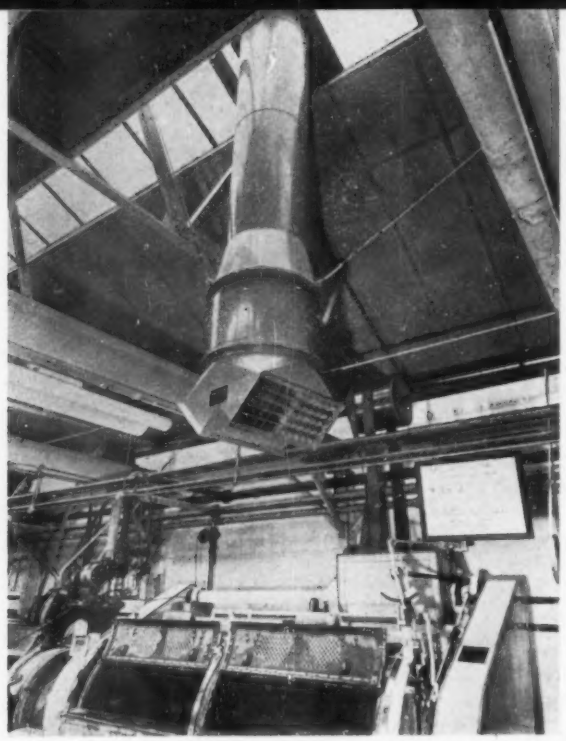


23

Air Conditioning: Equipment

AIR CONDITIONING OF BUILDINGS*

J. S. HALES
Director, Heating and Ventilating Research Council



THE subject title "Air Conditioning of Buildings" clearly needs a few words of explanation, since not only is it a term heard rather infrequently in this country, but it may be interpreted as covering almost every aspect of heating and ventilating a building. Recently the American Society of Heating, Ventilating and Air Conditioning Engineers decided on the following definition :

Air Conditioning is the process of treating air so as to control its temperature, humidity, cleanliness and distribution to meet the requirements of the conditioned space.

In this definition, the control of temperature clearly implies the use of both cooling and heating to maintain the required conditions in summer and winter, and it is in this respect that differences in emphasis between this country and those abroad are most marked. The main reason for this is almost too obvious to state, since it is the relatively mild climate which we enjoy—or perhaps one should say, about which one continues to grumble !

Now in discussing air conditioning it is important first of all to distinguish between that designed to provide optimum comfort of the inhabitants, and generally referred to as "comfort air conditioning" and that designed to deal with some particular manufacturing or other process which requires specially controlled conditions for its effective operation. At the present time it is clearly the latter form of air conditioning which is the more important in this country, although it will be seen that present trends are likely to bring comfort conditioning into greater prominence.

Factors Influencing the Adoption of Air Conditioning

Although as regards comfort air conditioning, summer temperatures in this country rarely call for a degree of cooling which cannot be reasonably provided by natural ventilation in the average office or home, conditions in most of our cities are changing in a manner that makes air conditioning very desirable in some circumstances. The increasing size of office blocks, many with extensive floor areas, is one instance of a trend of development in which the overheating and lack of ventilation of the internal areas, due to absence of outside windows and general low heat loss, calls for a measure of artificial cooling by a system of air conditioning. Again acute problems of noise arising not only from traffic at street level, but also increasingly from overhead, are mitigated only by ensuring the tight closure of outside windows which cannot then even be used as a natural method of ventilation. Of equal importance to that of noise is the question of dirt in the atmosphere and here again the opening of these windows, or even the infiltration of air through badly fitted windows, often causes unpleasant conditions and results in heavy maintenance of decorations and furnishings, particularly in the larger industrial towns.

Mention should perhaps also be made of the uncomfortable conditions which can prevail even in this country through solar gain of heat, especially where there are large areas of glass as in quite a number of the more modern buildings. In such cases the use of venetian blinds or non-actinic glass provide only a partial solution, while external shades cannot be considered practical in cities owing to the prohibitive maintenance involved.

As for public halls, cinemas, assembly rooms and similar buildings, these, in many cases, demand a standard of air purity and control of temperature and humidity, winter and summer, which only fully instru-

**This article is part of the Alfred Bossom Lecture given by the author at the Royal Society of Arts on November 28, 1956*

Picture : "Aerflo" fresh air supply unit, with directional outlet, by Supervents Ltd.

mented air-conditioning plant can satisfy. At the present time, almost without exception, cinemas have no facilities for chilling the circulated air, and most people will be only too well aware of the discomfort of such places in warm and humid weather.

In the industrial field, the increasing need to manufacture specialized goods to a standard and precision demanded by overseas competition and technical progress in processes and automation, implies that unwanted variables which can upset or retard production and productivity, such as the temperature and humidity of the works, stores or office, must be eliminated as far as possible. All these factors therefore point in the same direction of increased control over the air which surrounds the machines, the products and the staff involved.

Air-Conditioning Equipment

The design of air-conditioning equipment to provide the control of temperature both by cooling and heating, moisture and purity of the air in a building takes a variety of forms, and it is not the purpose of the present paper to describe the many variations which are possible. Basically most arrangements can be split into their main components which comprise (i) an air filter for the incoming outside air; (ii) means for regulating the humidity of the air; (iii) means for adjusting the final temperature of the air for either heating or cooling purposes; (iv) fan units to circulate the conditioned air; (v) duct work with associated air outlets to distribute the air to various parts of the building as required, and finally (vi) automatic controls to regulate the various parts of the system.

The scale of such equipment varies probably more widely than any other single type of engineering plant, and can range from the smallest unit designed to fit into the lower part of a window to condition the air of a single room, to the extensive centralized services for the largest office blocks.

Atmospheric Impurities and Filtration Equipment

Atmospheric dust—a term intended to cover all the solid impurities in the air including smoke—is of vital concern in air conditioning and on the effectiveness of its removal may depend the whole success or failure of the installation. This item of the equipment is likely to assume even greater importance as the cost of maintenance of decorations increases with the growing cost of labour and materials.

The main point of entry of dust and pollution is, of course, the fresh air intake into the air-conditioning plant—although "fresh" may sometimes be rather a misnomer. Dust can also enter a building through open windows or cracks around badly fitting windows, and hence these should be of good condition to minimise leakage. By designing the air-distribution equipment to maintain a slight positive pressure in the various rooms, it is then possible to exclude most of the extraneous sources of pollution, and thus ensure that the whole of the fresh air supply enters *via* the filtering unit. As already noted the tight fitting of windows is in any case very desirable from the point of view of excluding unwanted external noise. It is interesting in this connection to note that several buildings have in fact been designed and built with the almost complete exclusion of outside windows, with consequent simplification in construction and reduced heating and cooling requirements. It cannot be said, however, that this somewhat extreme form of construction has met with universal approval, although it undoubtedly lends itself to departmental stores and similar buildings, and is certainly an interesting innovation.

To appreciate the role of the filtration equipment, it is necessary to know something of the composition of dust in the atmosphere and some of the difficulties in its removal. In an average city's atmosphere, which may contain 500,000 particles or more in every cubic inch (compared with a mere 50,000 in country areas), nearly half the weight of impurities may consist of carbon and tarry particles, and the vast majority of all the particles may be concentrated in the very smallest sizes of 0·2-2·0 microns (a micron is one-thousandths of a millimeter, and for purpose of comparison the average diameter of the human hair is about 50 microns). When it is remembered that these are the particles which may be mainly responsible for staining decorations and fabrics, since they are not removed effectively by simple methods, such as water washing with sprays, owing to their small size and greasy and tarry surfaces, it will be appreciated that the selection of the right kind of filter is of paramount importance.

Many different types of filtration equipment exist, such as fabric filters, viscous coated filters, electrostatic filters. Each of these types have their own particular characteristics and applications, and in some cases two or more types may be combined to satisfy the necessary standards of air filtration. For removal of the very fine particles, often largely responsible for staining troubles, there is little doubt that the electrostatic filter is the most effective. Although this type of equipment is relatively expensive, its maintenance costs are low, whereas many of the throw-away designs of filters are much cheaper in first cost but entail high maintenance.

It should be noted that some care is needed in comparing the efficiencies of different filters, since not only is it necessary to specify rather carefully the range of particles to which the particular efficiency applies, but also to compare such efficiencies on the basis of the relative amounts which the different filters allow to pass through. Thus two filters having efficiencies of 98 per cent and 90 per cent on the same dust-laden air, allow 2 per cent and 10 per cent respectively to pass through; thus the first filter is five times as good as the second. Similarly, a filter of 98 per cent efficiency compared with one of half that efficiency will have an advantage of about 25 to one in its favour.

Air Conditioning of Buildings

Where relatively large volumes of air are circulated, these figures become of great significance, and what might appear as a relatively small drop in efficiency may well mean a substantial increase in staining trouble.

High filtering efficiencies may sometimes be obtained by substantial reduction in the speed at which the air is allowed to pass through certain filtering materials. This, however, is seldom practical owing to the extremely large expanse of filtering surface required, and in consequence the serious problem of finding or allocating sufficient room to house such equipment.

One aspect of filtration which must obviously be kept in mind is the possible influence of smokeless zones in reducing the excessive amount of soot and tarry particles and thus reducing the load on filtration equipment. Perhaps, however, this will be offset by the increase in atmospheric pollution caused by motor car and diesel bus and lorry exhausts. It may be, therefore, that the present practice on siting the "fresh" air intake for the air-conditioning plant somewhere between street level and roof level, in order to minimise pick-up of dust on the one hand and smoke on the other, may change, and in smoke control areas the fresh air intake moved up towards roof level.

Sound and Noise Problems

Mention has already been made of the advantages of air conditioning in excluding external noise entering windows. But this pre-supposes that the noise arising from the operation of the plant itself is acceptably low. The amount of noise so produced is dependent on several design factors, most of which are concerned with the fan and circulating duct arrangements for the conditioned air.

The most general procedure for reduction of noise level produced by the circulating system is to use, as far as possible, low-speed fans and low velocities in ducts and at air outlets, and recommendations exist for this purpose. This procedure, however, often leads to the obvious difficulty of requiring large fan and duct sizes which sometimes present the architect with a difficult planning problem. Consequently, in recent years, attention has been given to high-pressure high-velocity systems which bring about substantial reductions in duct sizes. Naturally, such high-pressure and high-velocity systems, which absorb more electrical power for a given air flow, have to deal with increased noise generation by special designs of sound baffles and absorbers in duct work and at air outlets.

Examples of Air Conditioning Systems Using Small Duct Sizes

It is not until either a drastic reduction occurs in the amount of air to be circulated, or until the high-pressure high-velocity systems or combinations of the two are employed, that really small ducts become possible. One method of reducing the amount of air to be circulated is to take most of the heating and cooling load away from the air and distribute it using water as the heating or cooling medium in heat transfer surfaces installed in the actual spaces to be conditioned. One such method now being extensively adopted in the United States makes use of high-velocity air distributed through small ducts to individual heating and cooling cabinets situated in the conditioned space, the coils in the cabinets being fed with either chilled or hot water as required from a centralized source. The air issuing from the high-pressure apertures in the cabinets is first carefully baffled to eliminate unwanted noise, and is so arranged as to entrain large volumes of the room air which are thereby induced to pass through the heating or cooling coils, thus producing the required room temperatures. The primary high-pressure air is often less than one-fifth of the total air circulating through the room, and this, combined with the high velocity in the ducting, enables the latter to be of very small size. It should be noted with this system that provision must be made for draining away the condensate which forms on the cooling coils in each of the cabinets.

Another method of splitting the heating and cooling load between surfaces in the room and distributed conditioned air, and thus reducing duct sizes, is that employing ceiling panels which can be fed with either heated or chilled water, and by incorporating ducts and outlets for conditioned air in quantities only sufficient for normal air change requirements. With this method the limit to the amount of cooling by the ceiling panels is set mainly by avoidance of condensation on the surfaces.

A third method, of recent development, is one employing twin supplies of hot and cold air using high-pressure high-velocity distribution. According to this method, which is stated to provide good individual control for all parts of a building, the hot- and cold-air supplies are blended in specially designed outlets, incorporating sound baffling and automatic control dampers of special construction. Since in this method the full heating and cooling load is carried by the air, the electrical power consumption is increased.

Air Outlets and their Location

Although the primary object of the air outlets is to bring in the conditioned air, they should be arranged so that they produce as much eddying of the surrounding air as possible, without however causing noticeable draughts. In this way they can produce a more stimulating atmosphere and counteract any tendency towards stuffiness in isolated regions. Experiments have shown that the slot form of inlet is more effective in creating eddies than apertures having more uniformly proportioned dimensions, including grilles, and there are now a variety of designs, including concentric baffles, which aim at achieving the best distribution

pattern. In one American installation, use is made of a continuous slot extending the full length of the room for the admission of conditioned air; in this instance the air is directed upwards to sweep over the extensive window area and so counteract any downcoming cold air which might otherwise produce unpleasant floor draughts—in the same way as radiators placed under windows. Problems arise, however, with this method when curtaining is required at windows.

In some designs of outlets for the higher-velocity systems now being used, a carefully arranged sound-absorbing chamber is incorporated immediately behind the outlet, which is invariably provided with means of adjustment for both velocity and direction of the incoming air.

The actual positioning of air outlets must depend to a large extent on the type of space to be conditioned, and whether or not the outlets must be disguised or not. Thus in the traditional type of building there will probably be a tendency to conceal the outlets, while with more contemporary structures the outlets may well be made a feature, or form some part of a special treatment of ceiling or wall. In all cases, however, it is vitally important that the outlets are in the right place and not tucked away merely for the sake of appearance.

Whatever treatment is preferred, outlets must prevent the incoming air from splaying on to nearby surfaces, since even if the air filtration is highly efficient, there is always a tendency for dust particles to deposit themselves on such surfaces, particularly when the latter are at a lower temperature than the air. Although from some points of view, principally that of temperature distribution between floor and ceiling, outlets at the base of the room have some advantages, the problem of dust pick-up at floor level, and the increased difficulty of avoiding noticeable draughts, are serious objections. Certainly in the case of a public hall where smoking is permitted, there is everything to be said for bringing the conditioned air in from the top and extracting from the base, thus keeping the upper atmosphere as clear as possible.

Industrial and Specialized Application of Air Conditioning

By far the largest field of application of air conditioning is to be found in industry, where requirements for controlled temperatures, humidity and purity are rapidly becoming more and more exacting. Each section of industry has its own particular problems, and it is only possible to touch lightly on a limited number of aspects of special interest. In many cases the air conditioning is purely local and applied merely to the particular machine or part of the processing plant needing accurately controlled air conditioning.

Not unexpectedly many of the newer synthetic fibres now used on high-speed precision machinery demand controlled atmospheric conditions, and the case of nylon-stocking manufacture is a good example in which special emphasis is placed on control of humidity and temperature—humidity to ensure that the fibres remain sufficiently strong, and temperature to ensure that the very small tolerances used in the knitting process remain unchanged. In many textile processes the need to maintain an optimum humidity of the surrounding air may be occasioned not only by the need to maintain adequate strength and elasticity in the fibre, but also to avoid the build-up of static electricity which may result in the slowing up of the process by causing the fibres to be attracted to parts of the machinery or adjacent fibres to be repelled from one another.

Fruit storage is another example where air conditioning is playing an ever-increasing part in maintaining the necessary standards, but in this case not only must humidity and temperature be carefully controlled during storage and ripening, but also the chemical composition of the circulated air, particularly the carbon dioxide content. In this case also, chemical additives are sometimes used for accelerated ripening.

The food industry employs a wide variety of air-conditioning plant to ensure consistent products and safe storage, and each process, whether it be baking of bread on a large scale, or the making and storage of jam or macaroni, demands accurate control over temperature humidity and purity of air, without which serious losses can occur, due to such things as the rapid growth of mould on exposed surfaces or even the apparently trivial mishap of labels falling off the containers!

For some industries the need for air purity and complete freedom from even the finest particles of dust in the conditioned air are of paramount importance. One such case is the watch-making industry, while another is that of photographic materials in which there is a further requirement for freedom from "fog"-producing contaminants.

This is just a very brief reference to one or two industrial processes which depend on the right kind of

Layout of air conditioning ducting and air outlets in printing and box making works by The Andrew Construction Co. Ltd.

Air Conditioning of Buildings

air conditioning for their success, but it emphasizes once more that as large-scale production increases with more stringent economic conditions and higher costs of labour, the need for such accurate control of environment will continue to increase.

Activities somewhat removed from the purely industrial field, but of considerable importance, are the specialized research laboratories, many of which are of course attached to industrial organizations, the operating theatres, the libraries and similar buildings where valuable records or works or art are housed. Some of these present very special problems, such as those associated with atomic energy, since here the problem of filtration may be complicated by the presence of radio-active materials. Nowadays operating theatres are provided with air-conditioning equipment specially designed to remove the smallest particles of dust on which bacteria may cling, with temperature and humidity control to give the safest conditions for patient and operating staff alike. In this instance no air from the theatre is recirculated as in most comfort air-conditioning arrangements. Libraries and art galleries pay particular attention to humidity control—not too low, in order to preserve the optimum moisture content of the paper or canvas, and not too high, so running the risk of mould formation and growth.

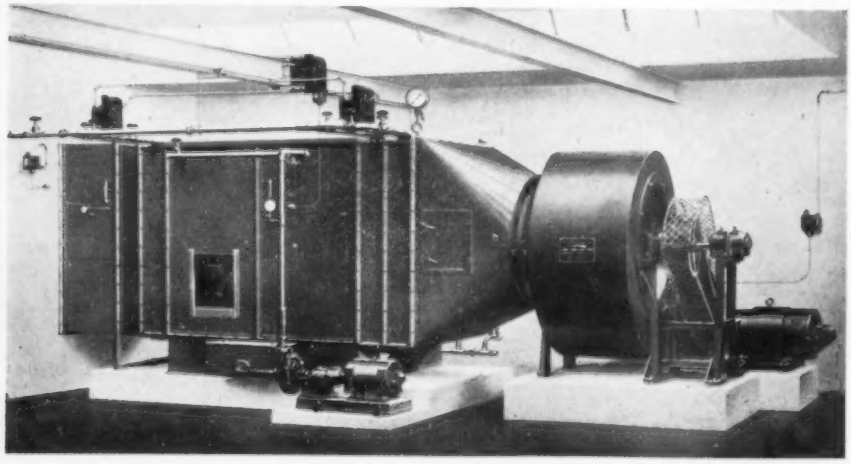
Air Conditioning and Possible Trends

It is seen that, although the place of air conditioning in many industrial applications is well established and will undoubtedly continue to expand, some of the problems associated with the provision of complete air conditioning in other fields will tend to retard its more ready adoption. Capital cost is one of the main deterrents, particularly where the advantages of a clean controlled atmosphere cannot easily be put on to a firm monetary basis. Another difficulty is that of providing sufficient space to house the somewhat extensive engineering services which a good system of air conditioning may involve, and here the trouble may often be a reluctance or omission of the architect and heating engineer to get together at an early enough stage of planning, so that each fully understands the requirements of the other and a satisfactory and convincing scheme can be put to the client or purchaser. Too often one hears of insufficient space left for the provision of the best type of plant, or unwillingness to spend that additional capital for those extra controls which may make or mar the whole project.

In looking at future trends one must obviously not omit reference to the possible use of heat-pump cycles of operation. As most people know, the heat pump enables low-grade heat such as that in the outside air to be upgraded to a useful temperature, using a relatively small amount of energy usually in the form of an electrically driven refrigerator.

Abroad there are a number of installations in use, but their success is determined to a large extent by the availability of a suitable source of low-grade heat, cheap electrical power and a fairly large cooling-load requirement. It is true that in this country, in spite of the great energy advantage obtained (which may amount to obtaining about 3½ times the quantity of heat for that put in as electricity for driving the plant) the cost of operation compared with more conventional heating, for example by oil, shows little saving. Where refrigerating plant is already being installed for cooling purposes, one is perhaps more than half way towards the possibility of heat-pump operation, with its attendant advantages on the score of labour, maintenance and freedom from atmospheric pollution. Even the possible disadvantage associated with fairly frequent defrosting of heating surfaces where outside air is used as the source of heat can be overcome by reasonably simple means which would only absorb some two to three per cent of the total heat requirements. In any event, the fuel situation will change progressively, with electricity cost tending to show increasing advantage over other fuels in the years ahead, when atomic energy is contributing a major part of the supply of power and the costs of alternative sources of energy tend to rise at a faster rate as they become less freely available.

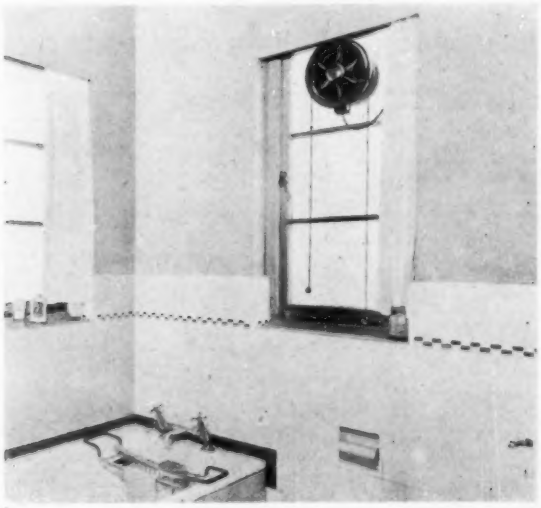
Finally, the general appreciation of the value of clean and controlled air will itself create demands for its wider use, and make us follow the American trend—but in a mild form—of air conditioned mindedness.



Typical air conditioning plant for a block of offices by Matthews & Yates Ltd.

FORCED AIR FLOW

Manufacturer	Type	Remarks
AIR CONTROL INSTALLATIONS LTD.	Window fan	The "Windovent" fan is designed for use in kitchens, restaurants, offices, shops, schools, etc. Catalogue available.
AIRSCREW CO. & JICWOOD LTD.	Wall fixing	Standard models in ten sizes from 12in to 48in dia. Standard finishes aluminium or grey. Catalogue available.
CHAPMAN ENGINEERING CO. (MANCHESTER) LTD.	Wall fixing	Fitted with streamlined impeller and totally enclosed steam proof motor and having bearings designed to allow fan to run with vertical spindle. Made in 9 sizes from 9in to 48in dia. and rated to move from 250 to 31,000 c.f.m. Catalogue available.
COLT VENTILATION LTD.	Window fixing	The "Two-way" fan automatically replaces the vitiated air which it extracts with fresh air from outside, the input exactly counterbalances the output. Glass silk filters may be fitted to the incoming port or a 1KW electric heater clipped on to the inlet port. The unit is spherical in shape being of 12in dia. and it may be completely sealed up by two shutters if necessary.
FENTON BYRN & CO. LTD.	See remarks	(1) Rubber bladed desk fans, finished cream stove enamel. (2) 9in window fan, constructed in aluminium alloy. May be fitted with either intake or exhaust impellers. (3) Propeller fans in 8 sizes from 6in to 30in dia. (4) 6in, 9in, 12in and 15in wall fans made with fixed or closable grilles for intake or exhaust. The fan casing may be extended to suit walls of any thickness. Several colour finishes are available.
GENERAL ELECTRIC CO. LTD.	Table and Bracket	These are made for both A.C. and D.C. supplies. The A.C. range includes : rubber bladed fans non-oscillating of 8in dia. and oscillating 10in and 12in dia., metal bladed oscillating fans of 10, 12 and 16in dia. and metal bladed non-oscillating of 12 and 16in dia. Standard finishes include silver grey, hammered buff and pastel blue. The D.C. range includes 12in and 16in oscillating and non-oscillating types, finished in hammered buff. Special types available include 6in vehicle fan and 12in cabin bulkhead and bracket fans.
	Ceiling fans	These include the following : (1) 56in sweep "Capacitor" induction fan. (2) The "Snipe" 36in sweep. (3) "Malaya" 56in sweep. (4) "Kingsway" 56in sweep. (5) "Kingsway Junior" 48in sweep, and (6) "Everest" 60in sweep. These fans are designed specially for tropical use.
GREENWOOD'S & AIRVAC VENTILATING CO. LTD.	Roof Extractor	The fan housing, base and weatherdome of the "Power Dome" unit are made from aluminium, but base and stack can also be of steel. Bases are made to suit either flat or sloping roofs. Five models are in the range with capacities varying from 300 to 4,800 c.f.m. Overall dimensions are from 16½in to 33½in high by 26in to 46in dome dia. and 14½in to 38in square bases. Motors are of the totally enclosed capacitor start-and-run type for A.C. supplies, 100 to 250 volts, 50 cycles, single phase and inputs vary between 38 and 525 watts.
HEAT INSULATION & VENTILATION CO. LTD.	All types	This firm has opened the Ventilation Centre at 3 Eagle Street, Southampton Row, London,W.C.1, where fans of all types and most makes are available for inspection. The object of this venture is to provide a centre where all problems of ventilation and air-conditioning can be discussed.



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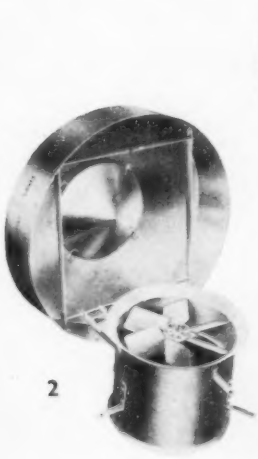

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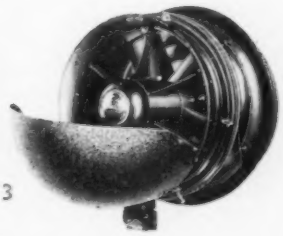

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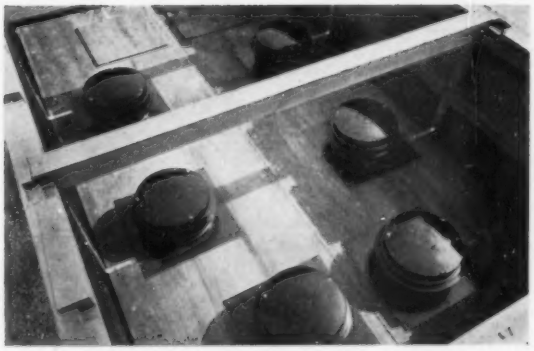

1 & 2. Closed and open view of Power Dome roof mounting extractor by Greenwood's & Airvac Ventilating Co. Ltd. 3. Vent-Axia 9in reversible unit with air deflector fitted. 4. Vent-Axia unit with Iris shutter fitted in bathroom of private house. 5. A number of manifold boxes with 9in polythene treated Vent-Axia units fitted to extract fumes from individual fume cupboards at the Glass House Experimental Station, Toddington, Nr. Littlehampton

FORCED AIR FLOW (continued)

Manufacturer	Type	Remarks
KEITH BLACKMAN LTD.	Air circulator	The "Tornado" type T.C. 16in air circulator is mounted on a support which makes the height of the unit 7ft from fan centre to floor. Direction of air flow can be adjusted through 30 deg. Total air movement is 8,500/12,000 c.f.m. and approx. input 100/220 W. Finish—brown cellulose with aluminium fan wheel.
	Window fans	The "Extravent" is supplied in 6in and 9in size for each model. They are of aluminium construction with blades of aerofoil section. Types EF1 and EF2 have displacements for the respective sizes of 10,500 and 18,500 c.f.m. and EF3 has 7,200 and 13,000 c.f.m.
	Propeller fans	Type APA fans are made in 6 sizes from 18in to 48in with volumes varying from 1,525 to 31,000 c.f.m. The main feature is a 3-bladed impeller with double curved blades. Fan rings are arranged for 4-point fixing but units may be fitted direct to roof ventilators, etc. Standard finish : light green enamel. Ancillary equipment includes, wire guards, automatic and hand-operated shutters and wind baffles.
	Axial ring mounted	Fans in this range are of 6in, 10in, 12in, 14in and 16in dia. and air displacements vary from 170 to 2,640 c.f.m. The fans have four aerofoil section blades and are available for both A.C. and D.C. supplies and for direct or belt drive. Ancillary equipment available as for the Propeller range above.
LONDON FAN & MOTOR CO. LTD.	Roof units	The "Phoenix" units are constructed from fibre-glass with base moulded to fit standard type roofs. Fan sizes range from 12in to 30in dia. and air movements from 700 to 11,500 c.f.m.
	Propeller	These are made in the following ranges : "Trojan" for refrigeration duty, 6in to 15in dia. with air movement up to 1,900 c.f.m. ; "Breeza" heavy duty totally-enclosed, 12in to 30in dia. and flameproof (Buxton certified) 9½in to 24in dia. ; "Cadet" 8in and 10in with capacities of 200/240 c.f.m.
MATTHEWS & YATES LTD.	Propeller	The "Cyclone" electric (A.C. supply) fan has a range of 12 sizes from 9in to 60in dia. and can be obtained with 4 and 6 blades. Wire guards for the motor side and shutters for the discharge side can be provided.
SCIENTAIRE LTD.	Extractor	Primarily designed for installation over kitchen cooker but may be used in other situations. Fan is of centrifugal type and is removable for cleaning. The unit requires ducting size 8½in by 2½in and is supplied with aluminium wall cap.
THE STANDARD & POCHIN BROS.	Roof ventilator	Made in 6 sizes from 12 to 36in dia. and having air displacements ranging from 950 to 14,500 c.f.m. Fans are of the propeller type and electrical inputs range from 80 to 750 watts. They are finished in black bitumastic painted or galvanized sheet steel.
SUPERVENTS LTD.	Ventilating unit	This unit, model AE, combines an automatic draught preventer with a ventilating fan. It is intended for window mounting and the draught preventer automatically acts when the fan is switched off. The motor is totally enclosed.
	Exhaust unit	(1) Glazing fixing unit has been designed with a flange plate for mounting directly between standard glazing bars and can be fitted to any slope of roof. A propeller fan is housed under the cowl, which is removable. Automatic shut-off dampers can be provided. (2) R.M.P. type, fan powered, roof mounting exhaust ventilator is made in four sizes. Its circular cap is removable to give access to the fan. It can be fixed direct to a constructional curb and to the ridge or slope of a roof. It can be fitted with automatic shut-off dampers. Both models can be made from galvanized steel sheet, aluminium or other metal.
VENT-AXIA LTD.	Ventilating unit	The units are made in four sizes with impellers of 6in, 7½in, 9in and 12in dia. and covering a volume range from 7,500 to 62,000 c.f.h. Impeller, casing, louvres, fixing ring and control switch housing are phenolic mouldings. May be fitted into the window glass or installed in walls, roofs and ducting systems. Attachments include hand operated shutters, weather cowl air excluder, dark room attachment, air flow deflector, grille and guard.
WOODS OF COLCHESTER LTD.	Window unit	The "Xpelair" window fan is made in three models with 6in, 7½in and 9in dia. Casing, outlet grille, impeller and Iris shutter are moulded in plastic. The mounting ring is of aluminium alloy. Extract capacities of the three models in c.f.h. are 7,500, 15,000 and 30,000. Motors may be for A.C. or D.C. supply. Speed regulators are available and the two larger models are finished black whilst the smaller is in cream with black shutter.
	Roof extractor	Series A, fan powered type can be supplied for flat or sloping roofs or for ridge mounting. 14 different models are available with fan sizes between 12 and 48in dia. Overall height varies between 23in and 45½in and width at top between 22in and 85½in. Fans are of propeller type and electrical supply may be A.C. or D.C. Series B units are made with four sizes of fan, 12, 15, 18 and 24in dia. They are of weather-cap type for flat or pitched roofs. Vertical jet units for industrial applications are part of this series having fan sizes of 15, 19 and 24in (both aerofoil and propeller type). Performance figures of the weather cap type vary between 1,000 and 5,500 c.f.m. whilst in the vertical jet units the aerofoil fans handle 2,250 to 9,500 c.f.m. and the propellers 1,700 to 7,250 c.f.m. Catalogue available.

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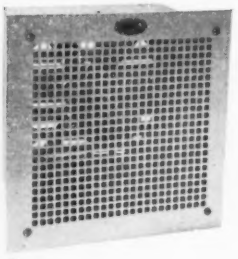

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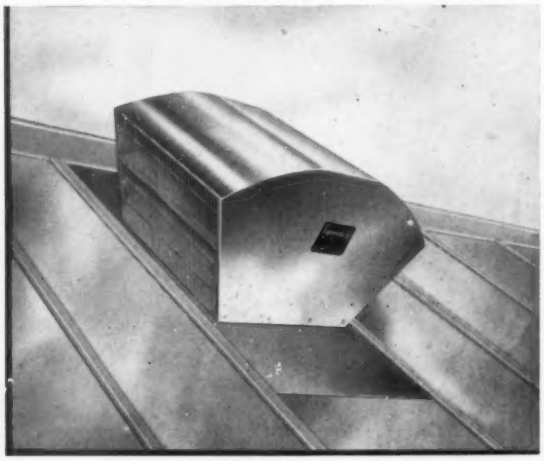

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1. Breeza Phoenix roof unit by London Fan & Motor Co. Ltd.
2. Wall fan by Fenton, Byrn & Co. Ltd., may be fitted with fixed or opening and closing grille for intake or exhaust.
3. "Supervents-Aerflo" exhaust unit glazing fixing

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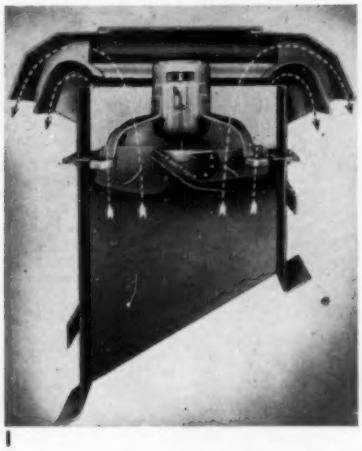

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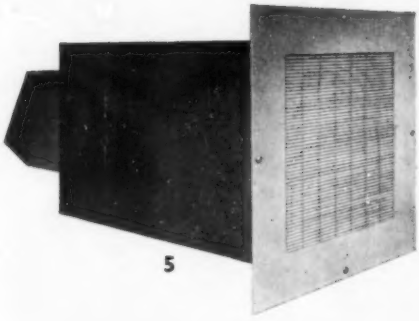

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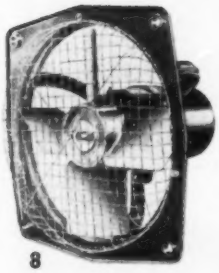

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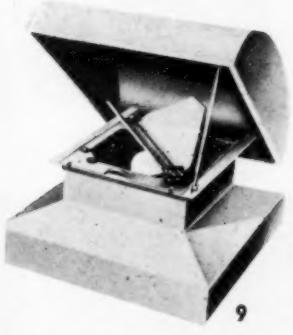

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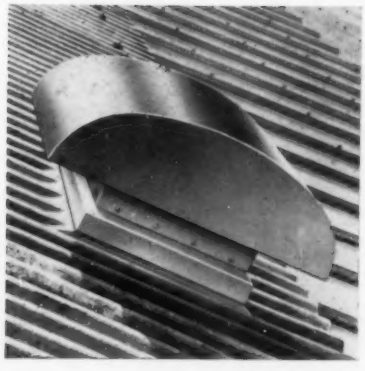

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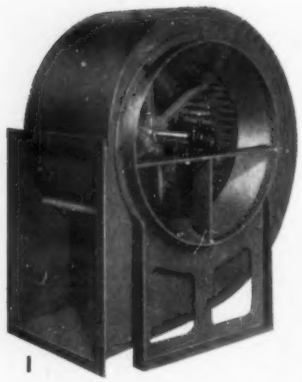
1. Series A fan-powered roof unit by Woods of Colchester Ltd. 2. The "Two-way" fan and heater by Colt Ventilation Ltd. 3. Type "TC" Tornado 16in circulating fan by Keith Blackman Ltd. 4. Motorized roof extraction unit with cowl, by Chapman Engineering Co. (Manchester) Ltd. 5. Extract unit for wall insertion designed for operating theatres by Fan Equipment Corporation Ltd. 6. "Cyclone" 6-bladed propeller fan by Matthews & Yates Ltd. 7. Draught-proof "Xpelair" unit, fitted with outlet grille by Woods of Colchester Ltd. 8. "Tornado" 12in ventilating fan by Keith Blackman Ltd. 9 & 10. Open and closed view of Series B roof unit by Woods of Colchester Ltd.



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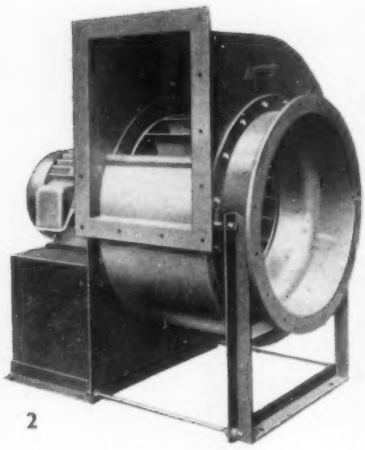

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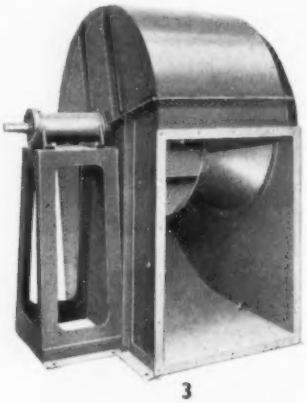

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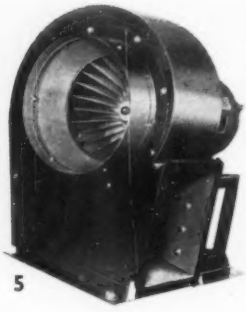

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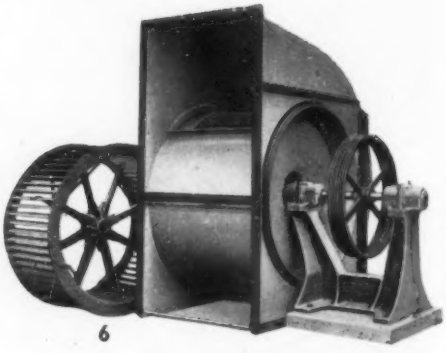

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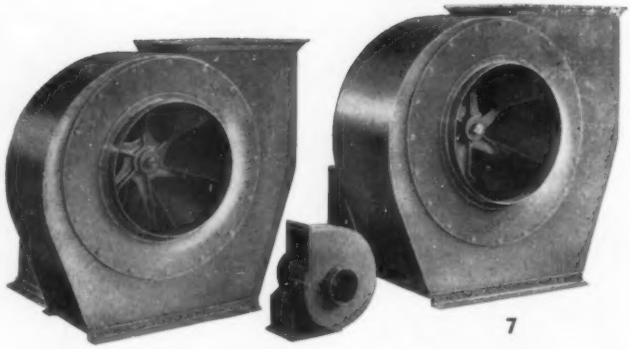
LARGE FANS

1. Belt driven fan by Alldays & Onions Ltd. 2. Turbro-cyclone P.V.C. fan with direct coupled motor by Matthews & Yates Ltd. 3. Backward bladed multivane fan by Scientaire Ltd. 4. No. 56 M.20 MK1 double inlet, forward curved, multivane fan by The Andrew Machine Construction Co. Ltd. 5. No. 12 Keith centrifugal fan by Keith Blackman Ltd. 6. "Cyclone" large S.S. Multivane fan by Matthews & Yates Ltd. 7. Paddle bladed dust exhaust fans by Chapman Engineering Co. (Manchester) Ltd. 8. Large plenum ventilating fan, by Sturtevant Engineering Co. Ltd., drawing air through electrostatic filters. 9. Large Sturtevant multivane air conditioning fan in course of construction. 10. Typical centrifugal fan forming part of air conditioning plant by Air Control Installations Ltd.



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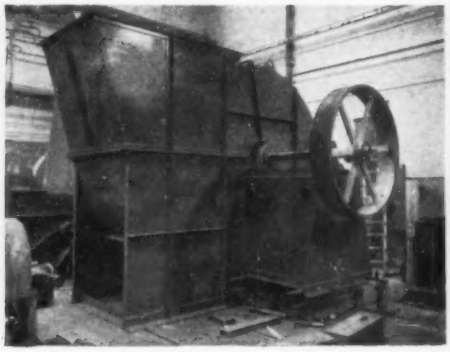

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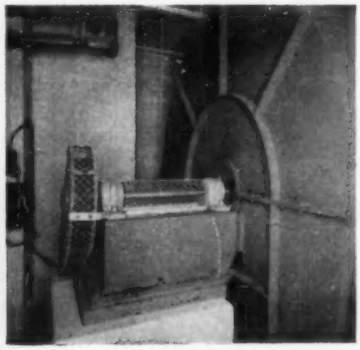
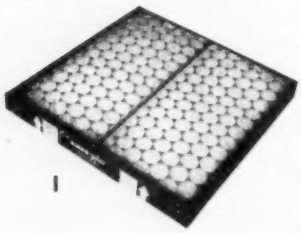


LARGE FANS

Manufacturer	Type	Remarks
AEREX LTD.	Radial Flow impeller	Two models (1) The Aeroform impeller has a number of aerofoil section blades attached to a flat backplate and specially formed backplate.(2) The Hyperform is designed as (1) but has single thickness blades and 5% less efficiency. Both obtainable in range with impellers varying in dia. from 13¼in to 120in or larger, and in both single and double width and inlet design. These fans are intended for all types of ventilation, air-conditioning, exhausting and dust control, etc.
	Duct axial	Developed for incorporation into ducting systems. Available in the following size fan diameters : 15in, 18in, 21in, 24in, 27in, 30in, 36in, 42in, 48in, 54in and 60in. This fan has non-overloading power characteristic to combat variations in the system resistance. Electric motors comply with B.S.S. 168 and 170.
AIR CONTROL INSTALLATIONS LTD.	Centrifugal	Low, medium and high pressure fans for air conditioning and most industrial requirements.
	Axial	Several types available, e.g. PFM90 for ducting bends and cased type PFM.
AIRSCREW CO. & JICWOOD LTD.	Centrifugal	Three main types (1) Forward curve (slow speed) ; (2) Paddle blade or radial (medium speed) and (3) Backward curve (high speed). Uses are (1) handling large volumes of clean air against moderate and high resistances and in special form for forced draught work ; (2) industrial work, particularly dust, vapour and fume handling and (3) all air movements and with special impellers for forced and induced draught. Standard sizes available between 6 and 60in.
	Axial flow	Three main types (1) Short-casing ; (2) Long casing and two-stage and (3) Bend type. Standard models of these vary from 12in dia. to 48in but any size from 6in to 24ft can be made to order. Belt driven fans are also made. Jicwood impellers may be made from laminated hardwood or from metal. Standard finishes are : Wood impellers—aluminium cellulose, aluminium alloy impellers—glossy grey oil paint and steel casings and impellers—grey paint. Cooling tower fans made from 5ft to 24ft in dia.
ALLDAYS & ONIONS LTD.	Low velocity	Specially designed to operate with low impeller and air velocities. Standard range covers impeller diameters from 3in to 120in and volumes up to 500,000 cu. ft. of air per minute. Catalogue available.
ANDREW MACHINE CONSTRUCTION CO. LTD.	Centrifugal and axial flow	Make fans for all purposes. Range includes the following types : forward curved multivane, backward curved with self-limiting power characteristic and paddle types for fibrous materials.
CHAPMAN ENGINEERING CO. (MANCHESTER) LTD.	Multivane	Made in sizes varying from 1in to 100in dia. Can be made for texrope drive. For example of performance it is claimed that the 36in inlet model absorbs 10 b.h.p. and has a capacity of 23,000 c.f.m. Also make dust exhaust centrifugal fans from 6in to 60in inlet, acid resisting, fume removing fans and Buxton certificated flame-proof exhaust fans.
FAN EQUIPMENT CORPORATION LTD.	S.C.B. Centrifugal	Specially designed for ventilating and air-conditioning applications in standard sizes from 7½ to 65in dia. Both single inlet and double inlet double width types are included in the range. Sizes 7½ to 12½ are built in steel but with driving side coverplate cast integrally with the bearing housing and base. The larger fans are of steel throughout. Also make type SPB centrifugal fans 7½ to 40 in for dust conveying, fume removal, etc. and type SRT radial tip bladed centrifugal fans with self-cleaning blades for induced draught and high temperature gas applications.
HEAT INSULATION & VENTILATION CO. LTD.	All types	This firm has opened the Ventilation Centre at 3 Eagle Street, Southampton Row, London, W.C.1, where the fans of several makers are available for inspection. The object of this venture is to provide a centre where all problems of ventilation and air-conditioning can be discussed.
JAMES HOWORTH & CO. LTD.	See remarks	Fans may be either direct or vee-belt driven and with Multivane or radial blade runners. They may also be fitted with ball or ring oil bearings. They can be supplied with a special vitreous type finish on the inside of the casing and the runner as an anti-corrosion precaution. In size, the fans vary from outputs of 250 to 114,200 c.f.m.
KEITH BLACKMAN LTD.	P.V.C.	Series 1—direct motor driven and Series 2—indirect pulley driven are designed for fume removal. Series 1 fans are made with 6, 12 and 18in dia. impellers with capacities from 50 to 2,500 c.f.m. Both backward and forward curved blades are available. Series 2 fans are made with 15, 18, 21, 24, 27, 30, 33, 36 and 42in dia. impellers with capacities from 2,000 to 40,000 c.f.m. Impellers have 16 forward curved blades. In both cases blades and fan casings are fabricated from P.V.C. P.V.C. bifurcated fans for disposal of actively corrosive fumes are also made in sizes from 10in to 19in dia. and with capacities from 555 to 4,100 c.f.m. Catalogue available.
	Centrifugal	There is a wide range of steel plate fans of many types available in sizes from 6in to 72in and in capacity ranging from 252 to 114,200 c.f.m. These may be either direct motor or indirect-pulley driven types. Catalogue available.
LONDON FAN & MOTOR CO. LTD.	Centrifugal	Multivane types made of steel are available for direct or belt drive
MATTHEWS & YATES LTD.	P.V.C.	The "Turbro-Cyclone" range is fabricated from rigid P.V.C. and designed for the handling of corrosive fumes, etc. at a temperature not exceeding 140 deg.F. They are available either with Vee rope drive or direct-coupled. Standard finish olive green.
MUSGRAVE & CO. LTD.	All types	Fans of any size manufactured for all applications of ventilation, air-conditioning and fume and grit extraction. Catalogue available.
PRAT-DANIEL (STANMORE) LTD.	Centrifugal	Fans manufactured with forward curved, backward curved and straight radial or radial tipped blades. There are three ranges of single inlet types : LD in sizes from 24½in dia. to 78in dia. ; MD from 11 to 78in dia. and HD from 19½ to 62½in dia. Catalogue available.
SCIENTAIRE LTD.	Multivane	The range of forward bladed single and double inlet fans covers many sizes from 7½in to 60in dia. The single inlet types are for handling air volumes from 180 to 100,000 c.f.m. and the double inlet type up to 150,000 c.f.m. Will also quote for special purpose fans outside the standard range.
THE STANDARD & POCHIN BROS. LTD.	Multivane	This range has curved forward blades and is pulley mounted. Both single and double inlets are included. The fans vary in size between 16 and 88in and handle air volumes between 2,000 and 60,000 c.f.m.
	C.B. uniform	This pulley mounted range of centrifugal fans have curved backward blades. Fan sizes range from 12 to 40in and capacities from 400 to 25,000 c.f.m. Can also be supplied direct-coupled.
	P.R. variform	This centrifugal fan may be adapted to conform to any hand or discharge position. Produced in a number of sizes from 9in to 24in and having capacities from 150 to 6,000 c.f.m. Catalogues available.
STURTEVANT ENGINEERING CO. LTD.	All types	This firm's products cover a very wide range of fans for all purposes. "D" paddle type fans are chiefly used for exhausting and are supplied in sizes varying from 9 to 30½in. Capacities are from 1,080 c.f.m. upwards. "W" paddle types are for collection of bulky materials. MV/4 multivane type fans have impeller blades curved forward and are chiefly employed for heating, ventilation and exhaust. There are many sizes to this range. Backward blade fans types BV and GV are made in several designs, some for ordinary ventilation work and others handling as much as 600,000 c.f.m. The Monogram is made in 12 standard sizes for small dust exhausting plants, etc. and can be supplied for vertical or bottom, right- or left-hand discharge. Axial flow and propeller fans are also made as standard in a large number of sizes. Catalogue available.
WOODS OF COLCHESTER LTD.	Axial Flow	The "Aerofoil" range comprises fans for most applications and includes single and multi-stage fans of the contra-rotating type. The large number of fans in the range have capacities ranging from 1,000 to 55,000 c.f.m. The impeller wings are adjusted to any pitch angle A.C. motors are totally enclosed squirrel cage induction machines and Buxton-tested flame-proof models are available. A simple cylinder type silencer is provided if required. Catalogue available.

FILTERS

Manufacturer	Type	Remarks
AIR CONTROL INSTALLATIONS LTD.	Replaceable media	Several types manufactured with rigid permanent frames. Glass wool types vary in size from 20in by 25in by 2in to 16in by 20in by 1in (10 standard sizes). Other models are available in sizes from 10in by 10in to 25in by 25in and over. Media used may be either copper, aluminium or nylon filaments, glass wool, pleated glass tissue or cellulose fibre honeycomb.
	Automatic self-cleaning viscous, multi-duty	Two types of panel available, type MS of galvanized wire mesh and type DD of die stamped, louvred sheet metal. These vary in size from 5ft high by 3ft wide to 15ft high by 41ft 9½in wide with respective capacities in c.f.m. of 3,500 and 235,200. Drive motors are ¼ h.p. electric.
	Electronic	Can be built up as desired from standard units 2ft sq. by 8in deep. A powerful electrostatic charge is applied to the filter material causing the individual fibres to become collecting electrodes which attract and hold the dust and smoke particles. Capacities in c.f.m. vary according to the arrangement employed.
	Viscous impingement	Wall fixing type consisting of LFO filtercells which are box shaped, containing corrugated plates and measure 16in high by 6⅞in long by 4½in deep. Each cell has a capacity of 500 c.f.m., when clean.
ANDREW MACHINE CONSTRUCTION CO. LTD.	Viscous	Oblique arrangement with cleanable elements. Built up of cells 8in high, each having a capacity of 800 c.f.m. and weighing 55lb. Filters are 24in deep.
	Replaceable media	Two types of element (1) Cotton wool ; (2) Glass fibre. (1) Built up of cells 8in high, each with 500 c.f.m. capacity ; (2) Cells 8in high, each with capacity of 900 c.f.m. In both cases filters are 24in deep and weigh 30lb.
CHAPMAN ENGINEERING CO. (MANCHESTER) LTD.	Replaceable media	Standard size is 8ft high by 6ft 6in wide by 7ft deep, having 8 removable panels each 2ft 9in by 1ft 6in. Filter panels are supplied in wool, monel metal, brass, copper, steel and glass wool. For example of performance one of these units is being used in a food factory to clean 3½ million cu. ft. of air per hour. Other sizes are available and the units are basically constructed from wood and aluminium.
HARRIS ENGINEERING CO. LTD.	Electronic	This Company handles the commercial installation of Trion equipment but industrial installation is undertaken by W. C. Holmes & Co. Ltd. of Turnbridge, Huddersfield. Upon entering the equipment, airborne particles pass through an electrostatic field and receive a positive electrical charge. The charged particles are then attracted to a series of collecting plates which have a negative charge. Once a month the collected matter is washed from the plates by an integral water wash system, operated by a hand valve. Made in sizes from 300 c.f.m. to 80,000 c.f.m. cased or built-up models.
HEAT, INSULATION & VENTILATION CO. LTD.	All types	This Company specialises in the installation of air-conditioning and ventilation systems and has opened the Ventilation Centre at 3 Eagle Street, Southampton Row, London, W.C.1, where individual units including filters of most makers are available for inspection. It is intended to provide a centre where all relevant technical queries may be discussed.
JAMES HOWORTH & CO. LTD.	Dry air filter	It consists of a series of independent pockets, made of cloth, which fit side by side. Expansion and contraction of the pockets is taken up by spring-loaded bolts. This method provides a large filtering surface and cleaning may be done by means of a special vacuum cleaner but the pockets should be washed occasionally. Tubular and wet type filters are also available.
MANCUNA ENGINEERING LTD.	All types	Supply all types of filters for both air-conditioning and dust removal. In the first category come expendable filter pads and heavy felt filters and in the second, electrostatic precipitators, wet and cloth filters and centrifugal separators or cyclones.



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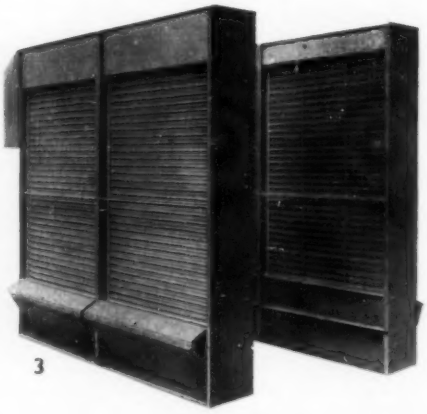
1. The "Amer-glas" replaceable unit by Air Control Installations Ltd. and 2. their "Multi-Duty" self-cleaning viscous type. 3. Preliminary air filter section of unit conditioner by Scientaire Ltd. 4. The "Precipitron" electrostatic air cleaner by Sturtevant Engineering Co. Ltd. 5. "Cyclone" 10 cell cotton wool, front withdrawal type filter by Matthews & Yates Ltd.



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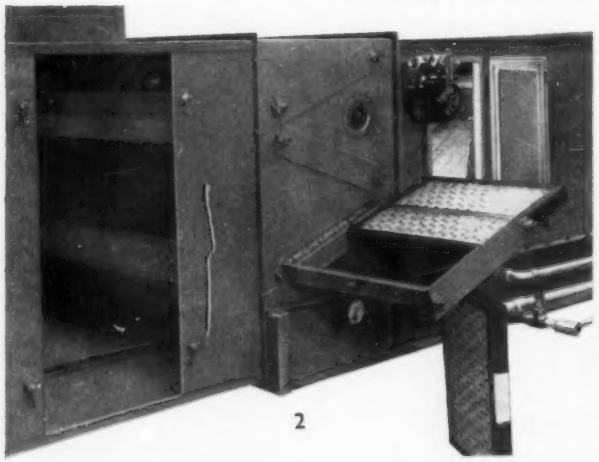

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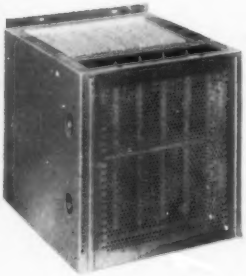

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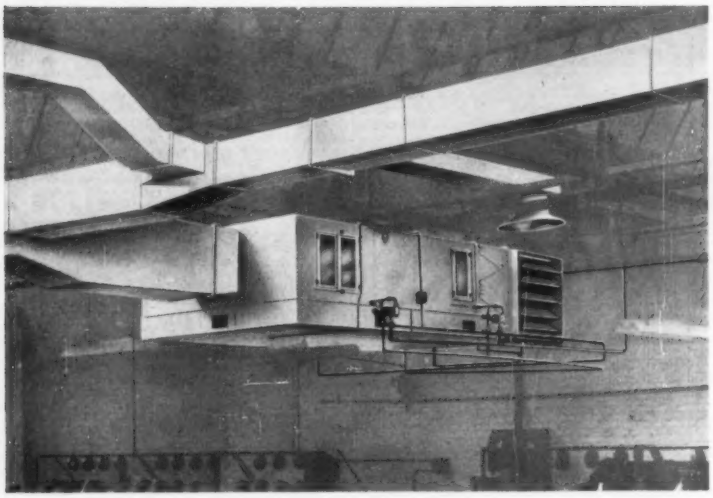
Manufacturer	Type	Remarks
MATTHEWS & YATES LTD.	Automatic rotary viscous	The filtering medium consists of a number of interchangeable cells containing oil moistened surfaces to which the dust adheres. The cells are suspended from two endless rotating chains and pass through an oil bath and up the air inlet side, eventually depositing the dust in the oil bath. The sludge, thus formed, settles at the bottom of the bath and is easily removable. 8 different size filters are made, each in widths of 3, 4 and 5ft and having capacities ranging from 3,000 to 21,350 c.f.m.
	Oblique viscous	These consist of standard unit cells 20in wide by 20in deep by 8in high which can be built up into batteries of any size. Cell units weigh 54lb and have a capacity which varies between 800 and 1,100 c.f.m.
	Replaceable media	Medium in this case is cotton wool and cells may be either front or side withdrawal type. Front withdrawal cells measure 18in wide by 24in deep by 8in high and side cells 18in wide by 28in deep by 8in high. The former may be built up into batteries containing any number of cells but the latter are restricted to two to the width.
OZONAIR ENGINEERING CO. LTD.	Continuous cleaning	The elements are supported in a framework and do not move. A curtain or screen, together with a reservoir of fluid, moves from side to side across the face of the elements which are thus subject to continual flushing. The curtain is powered by a $\frac{1}{2}$ h.p. motor and the reservoir is fed from a pumping unit driven by $\frac{3}{4}$ h.p. electric motor. Panels may be 3ft, 3ft 6in, 4ft, 4ft 6in or 5ft wide and heights of filters from 4ft to 12ft, with capacities varying from 1,620 to 21,500 c.f.m. Ozonair Ltd. describe themselves as Air Filtration Engineers and are concerned with the supply and installation of all forms of Air filters.
THE STANDARD & POCHIN BROS. LTD.	Replaceable media	This firm supplies air filters with removable and renewable units and also bag type units.
STURTEVANT ENGINEERING CO. LTD.	Electrostatic	The "Precipitron" air cleaner is claimed to arrest particles down to 1/250,000th of an inch and to give bacteria-free air. The air passes through an electrostatic field and the positively charged particles adhere to earthed collector plates until removed by washing with water. Makers state that this unit cleans air to an efficiency of 90% by the Blackness test which has been devised and approved by the American Bureau of Standards. Also supply viscous type filters.
VISCO ENGINEERING CO. LTD.	Static and self-cleaning	"Visco" filters are designed principally for use in steelworks and other heavily dust-laden atmospheres.
OKES LTD.	Microvee	This dry fabric filter panel can be built up into banks of any size. Panels are in 5 sizes ranging from 10in by 10in by $3\frac{3}{8}$in deep to 20in by 20in by 6in deep and in capacity from 65 to 690 c.f.m. The filter medium is a felted fabric sewn on to a woven wire gauze support and folded to form deep pockets. Cleaning is possible by shaking, compressed air or vacuum cleaner.
	Five-Ply panel	Made in both dry or oil-wetted types using thin porous fabric medium. Cleaning of dry type is as for Microvee but oil-wetted types should be washed in a solvent and re-impregnated with Trifiltrene. Sizes as for Microvee but capacities are: Oil-wetted—95 to 900 c.f.m. and dry—115 to 1,100 c.f.m. Three other types of panel filter, viz. Three-ply panel, Multivee filter and Multivee panel are available.
	K 600 Kompak	Units may be built up into banks both to the height and width. Each unit is a complete filter and is constructed by hinging together a series of wire frames or spacers. These frames are folded from either side alternately, one on top of the other and at the same time are interleaved with a continuous length of replaceable "Filterdown" material. Units are supplied with drilled angle iron frame and weigh $44\frac{1}{2}$lb, measuring $11\frac{5}{8}$in high by 1ft $11\frac{1}{2}$in deep. Standard finish is zinc plated, passivated and epikote lacquered.

Recommended minimum rates of fresh-air supply for human habitation as shown in B.S. Code of Practice—Chapter 1(c) (1950)

Types of Buildings	Recommended minimum rates of fresh-air supply to buildings	Types of Buildings	Recommended minimum rates of fresh-air supply to buildings
Assembly halls	1,000 cu ft per hr per person	*Office buildings*	
Canteens	1,000 cu ft per hr per person	Offices:	
*Factories and workshops**		200 cu ft per person	1,000 cu ft per hr per person
Work rooms	800 cu ft per hr per person	300 cu ft per person	720 cu ft per hr per person
Lavatories and W.C.s	2 air changes per hr	400 cu ft per person	600 cu ft per hr per person
Hospitals		500 cu ft per person	420 cu ft per hr per person
Operating theatres and X-ray rooms	10 air changes per hr	Lavatories and W.C.s	2 air changes per hr
Wards	3 air changes per hr	*Places of entertainment*	1,000 cu ft per hr per person
Houses and flats		*Restaurants*	1,000 cu ft per hr per person
Bathrooms and W.C.s	2 air changes per hr	*Schools*	
Halls and passages	1 air change per hr	Occupied rooms (classrooms, laboratories, practical rooms, etc.):	
Kitchens (cooking for not more than six persons)	2,000 cu ft per hr	100 cu ft per person	1,500 cu ft per hr per person
Living rooms and bedrooms:		200 cu ft per person	1,000 cu ft per hr per person
300 cu ft per person	720 cu ft per hr per person	300 cu ft per person	720 cu ft per hr per person
400 cu ft per person	600 cu ft per hr per person	400 cu ft per person	600 cu ft per hr per person
500 cu ft per person	420 cu ft per hr per person	500 cu ft per person	420 cu ft per hr per person
Pantries or larders	2 air changes per hr	Cloakrooms	3 air changes per hr
		Corridors, lavatories and W.C.s	2 air changes per hr
Kitchens (large)	Up to 20 air changes per hr	*Shops*	1,000 cu ft per hr per person

* The conditions in factories are regulated by the Factories Act, 1937, and regulations made thereunder. Numerical standards are not laid down, but in all cases an adequate standard of general ventilation is required by Section 4 of the Act. It is not possible, therefore, to say that, to satisfy legal requirements, a specific number of air changes, or rate of air supply per person, per hour is necessary, or that the same standard should be provided in each workroom: 800 cu ft per hr per person is regarded as likely to ensure comfortable working conditions in ordinary circumstances. Larger quantities of fresh air may be required for more strenuous types of work, or to maintain a reasonable temperature and humidity, or to replace the air removed by local exhaust systems. Movement of the air in the vicinity of the working positions may be a more important factor than the rate of fresh-air supply. With adequate air movement, the introduction of large quantities of air may not be necessary, and this may lead to the simplification of the heating problem. Dust and fumes which, by reason of their nature and quantity, are either harmful or objectionable should be removed at their source.



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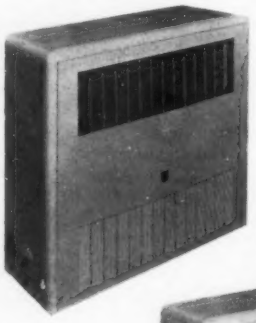

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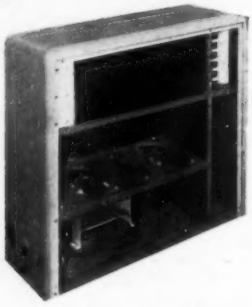

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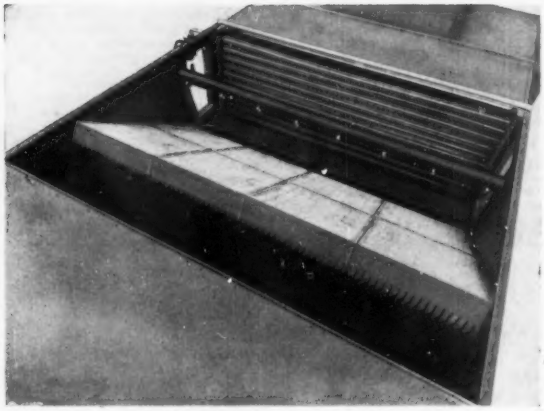

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1 & 2. Unit air conditioner by Scientaire Ltd., installed in a textile mill and section showing wet glass cells.

3 & 4. Front and rear view of Vectair cooler, propeller fan type by F. H. Biddle Ltd.

5. No. 101 Room air-conditioner by F. H. Biddle Ltd.

UNIT AIR CONDITIONERS

Manufacturer	Type	Remarks
AIR CONTROL INSTALLATIONS LTD.	KD.	These units are built up from standard sections and can be built to specification. 8 different size standard units available with airflow for industrial purposes ranging from 1,150 c.f.m. to 13,500 c.f.m. Cabinet is of sheet metal, welded angle frame, with removable insulated panels and is provided with external connections for heating and cooling coils. Inside parts can be removed for inspection and cleaning. All parts protected against corrosion and panels stove enamelled. Vertical mounting of some units can be arranged.
F. H. BIDDLE LTD.	Room air-conditioner	Two models (A) No. 101—1 h.p. ; (B) No. 51—½ h.p., both for window cill fitting. The section of the unit which extends outside the window contains most of the working parts and is weather-proofed to withstand tropical conditions. The front cabinet which extends into the room houses a removable filter and control switches and is finished in cream enamel. Air can be exhausted from the room, introduced without cooling or filtered, dehumidified, cooled and circulated with or without fresh air from outside. Overall dimensions : (A) 28⅛in wide by 36⅛in deep by 14⅛in high with 16⅞in projection into room—nett weight 250lb. (B) 26⅛in wide by 29⅞in deep by 13⅞in high with 14⅞in projection into room—nett weight 165lb. Working voltage 220/240, single phase, 50 cycle. Recirculating air quantities (A) 300 c.f.m. ; (B) 220 c.f.m.
GENERAL ELECTRIC CO. LTD.	As above	Two thermostatically controlled units are available both having overall dimensions of 28in by 31in by 18in. Model V3512 is for cooling only whilst V3514 incorporates a heat pump. They can be installed flush with the inside wall or window or with the outside of the building or in intermediate positions if desired. The recirculating capacity of the conditioner is 350 c.f.m. but up to 65 c.f.m. of this may be fresh air drawn from outside. The filter is of nylon mesh and is washable. Case is of stove enamelled sheet metal and the front panel is available in three colour schemes on backgrounds of silver, maroon or green.
HEAT & AIR SYSTEMS LTD.	Cabinet type	Model No. C2739 is available for 2-5 tons refrigeration rating—24,000/60,000 B.Th.U./hr, cooling duty—1,000/2,500 c.f.m. circulating air. Designed primarily for tropical use and especially for hospitals, clubs, offices and residential quarters. The floor mounting cabinet is constructed from sheet metal and angle framework, enamel painted and measures 6ft 6in high by 4ft by 3ft.
SCIENTAIRE LTD.	Unit	4 standard units are manufactured, Nos. 120, 140, 160 and 180 having respective air quantity ratings of 2,000, 4,000, 6,000 and 8,000 c.f.m. Air heaters, refrigeration equipment, air washers and humidifiers may be fitted and combinations of units may be built up. They may be floor mounted or suspended from the roof.

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BALL RACE RUNNERS

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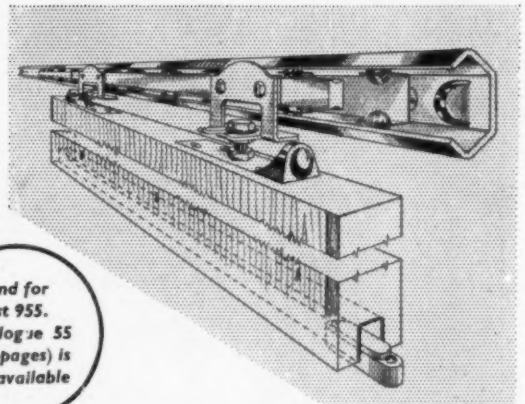
The ideal choice to hang doors up to 150 lbs. for Office, Stores, Flats, Railway and Motor Coaches, Ships etc. etc. Precision made, beautifully finished, quiet in action and give lasting efficient service. Range of standard sets to suit single doors up to 4 ft. wide.



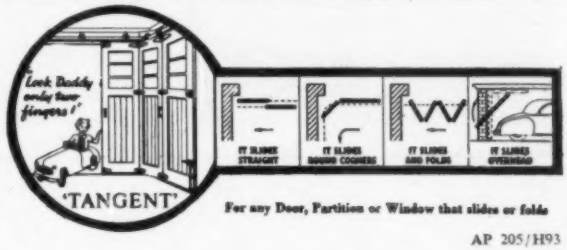
Send for List 955. Catalogue 55 (184 pages) is also available

Hartwell House, Aylesbury—
Doors from Conference Room to staircase.

Architects: Burgess, Holden & Watson, F/L.R.I.B.A.
Contractors: Webster & Cannon Ltd.

Henderson SLIDING DOOR GEAR

P. C. HENDERSON LTD
HAROLD HILL, ROMFORD, ESSEX
Telephone: INGrebourne 4444



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AP 205/H93

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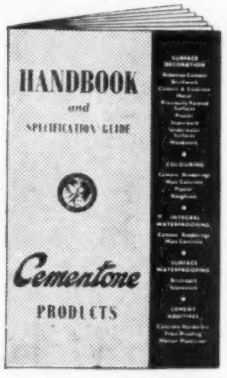
Wherever the building contract, there is usually a place for one or other of the Cementone Range. Full details of all these products will be found in the Cementone Handbook, sent free on request.



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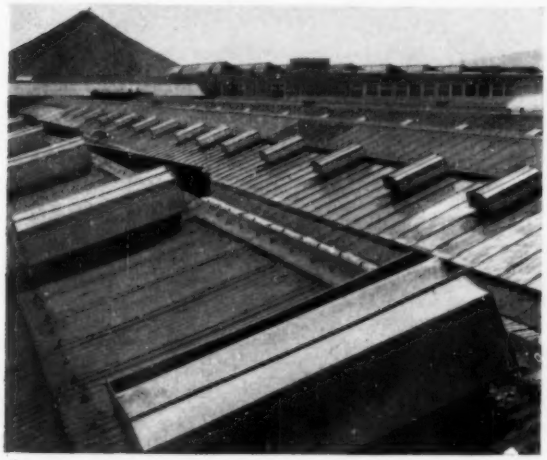

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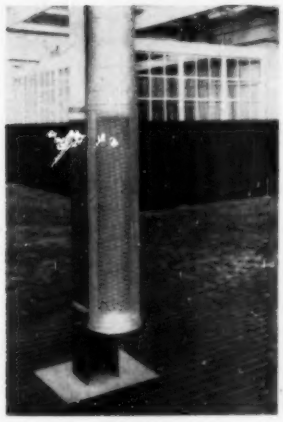

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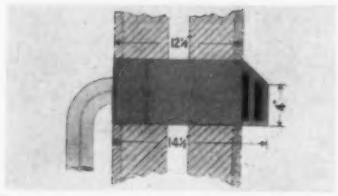

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6

NATURAL VENTILATORS & DIFFUSERS

1. Colt SRC type ventilators by Colt Ventilation Ltd., installed at the Hirwaun Factory of Dunlop Rubber Co. 2. Installation of Stack roof ventilators by Hills (West Bromwich) Ltd. 3. Type "C" diffuser by Sturtevant Engineering Co. Ltd., and 4 their type "O" diffuser. 5. No. 418 "Dean" ventilating air brick in salt glazed fireclay by J. & R. Howie Ltd. 6. Combined air-diffuser and lighting unit by Anemostat (Scotland) Ltd. 7. Installation of square glass dome type ventilators for classrooms and corridors (Hertfordshire C.C.) by Greenwood's & Airvac Ventilating Co. Ltd. 8. P.R. 2046 (2ft by 4ft 6in) ventilator for glazing bars by Colt Ventilation Ltd

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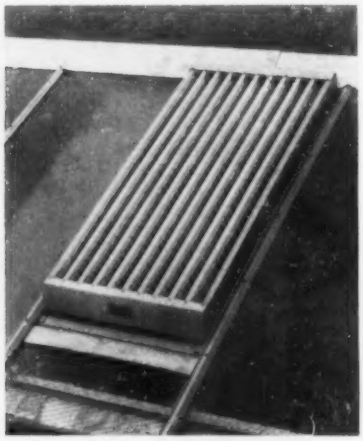

A LIST OF SUPPLIERS

KEY: **A**—Air conditioning plant. **B**—Air ventilating plant. **C**—Plenum heating plant. **D**—Humidification or dehumidification plant. **E**—Humidifiers and/or heaters. **F**—Dust and fume control plant. **G**—Large fans for air conditioning, etc. **H**—Fans for natural air. **I**—Filters. **J**—Unit air conditioners. **K**—Ventilators. **L**—Diffusers.

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A C D F G H I J	*AIR CONTROL INSTALLATIONS LTD., Victoria Road, Ruislip, Middx. Ruislip* 4066.
G H	*AIRSCREW CO. & JICWOOD LTD., Weybridge, Surrey. Weybridge* 1600.
G	*ALLDAYS & ONIONS LTD., Great Western Works, Sydenham Road, Birmingham 11. Victoria* 2251.
A B D F G I	*ANDREW MACHINE CONSTRUCTION CO. LTD., Woodbank Works, Stockport. Stockport* 3441.
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K	*ARGOSY ENGINEERING LTD., Argosy Works, Hertford Road, Barking, Essex. Rippleway* 1081.
A D	*ATMOSPHERIC CONTROL LTD., 41 John Dalton Street, Manchester 2. Blackfriars* 7423-4.
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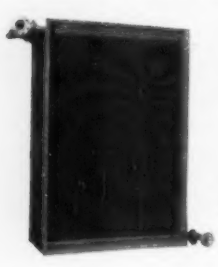

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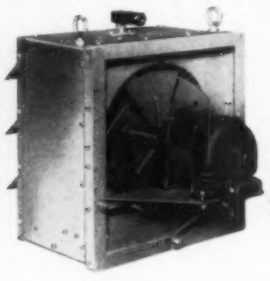
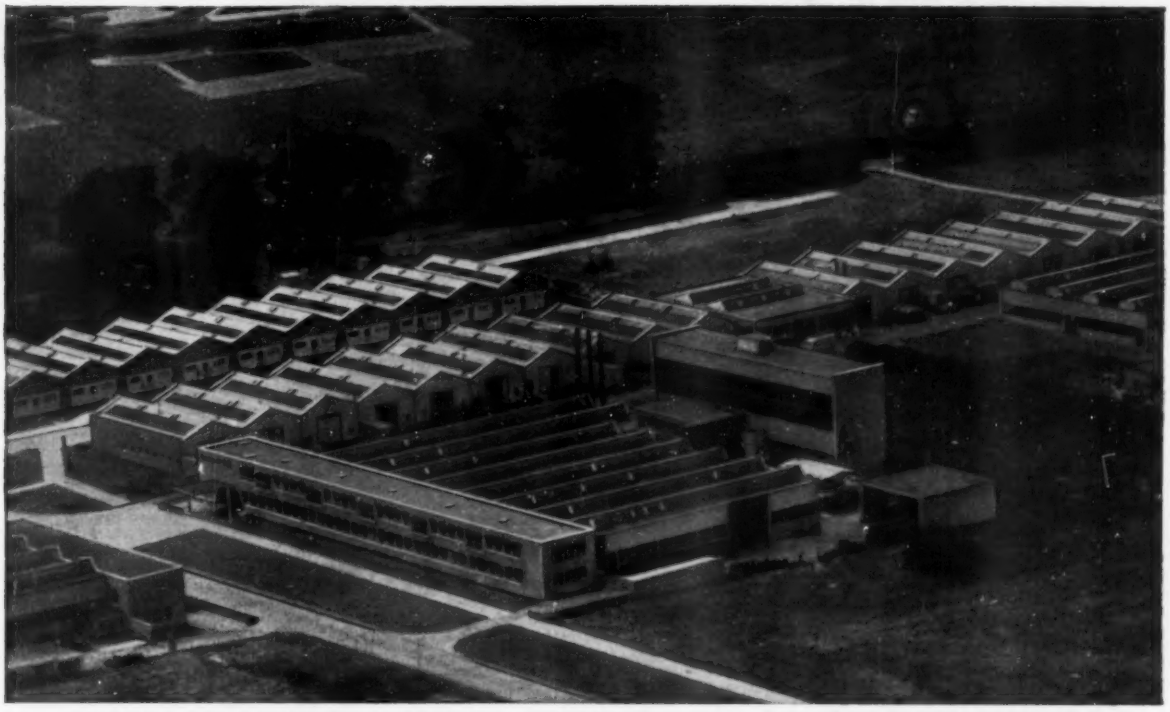


2

1. Flatfin air heater as used in air conditioning plant by Standard & Pochin Bros. Ltd. 2. Electrically heated, suspended type heater unit by Sturtevant Engineering Co. Ltd.

49 factories at HARLOW New Town all ventilated by COLT

FREDERICK GIBBERD ESQ. F.R.I.B.A., M.T.P.I.,
ARCHITECT PLANNER, THE HARLOW DEVELOPMENT CORPORATION.



This is one of several National industrial developments where COLT Ventilation equipment has been used. Others have been the Silicosis, Advance and Standard Factory Programmes and the Ex-Wartime Factories involving 96 Factories under Sir Percy Thomas & Son, F/A.R.I.B.A., The Wales and Monmouthshire Industrial Estates where for thirty-two factories COLT Ventilation equipment was specified by Jonah Arnold & Smith. The Remploy Factory Programme under the Ministry of Works where nearly one hundred factories were ventilated by COLT.

COLT Ventilation equipment has also been specified for many further contracts on Industrial Estates at Slough, Stevenage, Crawley, Trafford Park; for the Northern Ireland Advance Factory Programme, Scottish Industrial Estates, The Ministry of Supply Factories and Irish Estates Ltd.

COLT

Send for Free Manual on Colt Ventilation to Dept. AW99/12.

VENTILATION

COLT VENTILATION LTD · SURBITON · SURREY

TELEPHONE: ELMBRIDGE 6511 (10 lines)

U.S.A. Subsidiary: Colt Ventilation of America Inc., Los Angeles.

Branches at: Birmingham, Bradford, Bridgend (Glam.), Bristol, Coventry, Dublin, Edinburgh, Glasgow, Liverpool, London, Manchester, Newcastle-upon-Tyne, Sheffield, and Warwick.

Agents in: Australia, Belgian Congo, Canada, Cyprus, India, Indonesia, Madagascar, Malaya, Mauritius, New Zealand, Pakistan, Portugal, North and South Rhodesia, and South Africa.

G. 357

ELLARD

ESTATE

SLIDING DOOR GEAR

The illustration on right shows yet another example of the use of ELLARD "Estate" Sliding Door Gear in the modern dwelling house. See how simple it is to convert a spacious room to one of a cosy and intimate atmosphere. The fingertip smoothness of door action offers immediate reduction of living space when desired with the additional advantage of fuel economy. Elegant appearance, ease of operation and long service are the main selling features of this attractive ELLARD Door Gear. Excellent design, moderate cost and maximum use of floor space make ELLARD Door Gear the obvious choice for both council estates and private houses.

RADIAL

SLIDING DOOR GEAR

Illustration on left shows ELLARD "RADIAL" Sliding Door Gear fitted to a private garage. Sliding doors are of great advantage in protecting cars against damage caused by accidental swinging of hinged doors. In addition, valuable working space is offered where it is most desired at the entrance to the garage. Note also how ELLARD Door Gear provides easy access to and from the garage by a personal entry door. ELLARD "Radial" Sliding Door Gear is low in price and gives long service without maintenance. This gear is also suitable for the larger openings of commercial and industrial garages

OVERDOR

GARAGE DOOR GEAR

ELLARD "Overdor" gear, illustrated on right, represents the best method of operating an overhead-type door, and it requires the minimum space, fixing time and maintenance. An entirely clear threshold is achieved, and both side walls are available for windows or shelves. "Overdor" gear is designed for doors from 6ft. to 7ft. 3ins. high and up to 200lbs. in weight. The door is safely balanced and can be opened and closed with ease. The width of the door is not critical but the construction should ensure that the door does not sag when in the raised horizontal position, and we suggest a maximum width of 10ft. The balance springs impose a maximum force along the jambs, thus relieving the building of all stress until the door is raised, when less than half the weight of the door is supported by the twin top tracks. ELLARD "Overdor" is therefore especially suitable for lightly constructed buildings.

Immediate delivery of ELLARD "Estate", "Radial" and "Overdor" Sliding Door Gear can be obtained from large ironmongers and builders' merchants throughout the country.

ELLARD SLIDING DOOR GEARS LTD., (Desk 5), WORKS ROAD, LETCHWORTH, HERTS. TEL.: 613/4

BMJ

American Housing

I HAVE been reading the Report on American housing which was published a little time ago by the Federation of Registered House Builders as a result of a short visit to the U.S.A. made by six members of the Federation in the autumn of 1955. Although this Report is too brief to give a true picture from which the efforts of the house builders in the two countries may be compared it contains a number of points which are of considerable interest. The aims of the tour were to study, at first hand, the organization and construction techniques of private house-builders, to examine the methods adopted by individual firms and by their organization, the National Association of Home Builders for the Promotion of Home-Ownership, and to maintain and foster good relations with organized house builders and developers in the United States.

Private Builders

Traditionally, house building in America is a function of private enterprise. From 1949 to 1955 the total number of non-farm dwellings started each year varied between 1,025,100 and 1,329,900, of which Public Authorities were responsible for only 71,200 in the highest year and a mere 18,700 and 19,100 in 1954 and 1955 respectively. The general pattern of private enterprise house-building is not greatly different to that in the U.K. as 96 per cent of builders are responsible for less than 24 houses a year, but they account for 46 per cent of the total number built. Less than 20 per cent of the houses erected are built by firms erecting more than 250 houses per annum. It should be noted that the general pattern of the industry in U.S.A. is based on sub-contracting. The Report says that a great deal of the work is let to specialist sub-contractors who are responsible for the supply of the plant and materials needed for their own operations, which reduces the administration costs of the builder himself. Much of the rest of the work, e.g. the carpentry, may be let to labour-only sub-contractors. It was estimated that, by the end of 1954, fifty per cent of all American families owned their own homes.

Design of Houses

The Report says that despite mass production and the increased use of standardized components there is no standard design and no "typical American house". The one-storey house which originated in the West is the most popular style and more than eight out of every ten houses now being built are of this style, with variations to suit the climate and the taste of each district. In areas where land is at a premium the "split-level" house is finding increased favour; this design was originally developed for sloping sites where it was economic to provide semi-basements for recreation rooms with boiler and wash room adjacent and with the bedrooms a few feet above the surrounding ground level. It is noted that this type of design is becoming so popular that some builders are grading their sites in order to be able to build split-level types on land originally level.

In regard to accommodation it says that the average new home provides more than 1,100 sq ft of living space; two-thirds have three or more bedrooms: about one in ten had an additional lavatory and about one in twenty has two complete bathrooms.

Value of Architects

A very high proportion of low-cost housing is architect-designed, but the architect is commissioned by the builder more frequently than by the intending purchaser. The builder adopts this practice as a good business proposition because American architects provide something the public is prepared to pay for. The contributory factors to the wide spread use of architectural services appear to be the provision of working drawings at a reasonable charge, a degree of specialization on housing in many architect's offices and the fact that some States will only grant planning consent if an architect registered in that State has been employed. A final paragraph on design says that the design of American houses is primarily influenced by the practical necessity of reducing to a minimum the number of labour-hours on the site while still providing whole house heating and the equipment required by a high and rising standard of living. From the illustrations in the report it seems that the quality of the architecture, if these are typical examples, is higher than much that may be seen in this country.

Methods and Materials

The methods of construction used in the U.S.A. vary considerably from those used in this country and in most instances the weight of the structure is much lighter. About two-thirds of the new houses are built without basements and eight out of ten new houses are of framed construction, the remainder being of solid masonry, brick veneer or combinations of masonry and framing. The visiting team formed the opinion that the American house building industry would not be able to maintain its present rate of output if it used the normal forms of solid construction employed in this country. To these observations is added the comment that the availability of timber and appropriate craft labour would need to be co-ordinated before any advantage could be obtained from changing the methods in this country to framed construction.

Standardization

Space is devoted in the report to the subjects of prefabrication and modular co-ordination. It is suggested that mass production of houses has led to a greater standardization of building materials and to a more widespread use of prefabricated component parts. Prefabricated houses manufactured entirely in the factory and assembled by the house-builders on the purchaser's plot accounted for about eight per cent of new house construction in 1954 and was expected to be a considerably greater proportion in 1955 and 1956. The Report says that whatever may be the future of the wholely prefabricated house their informants agreed that there will be increasing use of prefabricated components, such as floor and wall panels, cupboard wall units and roofs cut to standard sizes in the factory and ready for assembly on the site. In regard to modular co-ordination the Report says that considerable stimulus is being given to the development of prefabricated parts by the growing interest in modular co-ordination which it suggests is helping to reduce costs and increase speed. It is stated that the most generally accepted module is based on 4in and many industries are now standardizing their products on this basis.

Heating System

As whole-house heating has become almost universal in American homes great importance is attached to the question of insulation against heat losses so that the type of construction used gives a high level of heating insulation and weather-resistance. The American method of dry wall construction, utilizing minimum weight internal finishing materials, provides a finish free from condensation and other problems with which we in this country are familiar. They suggest that this factor, as indeed the whole question of heating and heat loss, is

American Housing

one which merits great attention in Britain, having particular regard to the much higher cost of heating houses in this country. They suggest that the "U" factor should not exceed 0·15 for exposed exterior walls, which compares with 0·30 B.Th.Us for the normal 11in cavity brick walls used in this country. On the subject of windows the Report notes that wood window frames still predominate in the new housing but that steel and aluminium windows are gaining ground.

Equipment

The study team noted that the continuous urge towards higher living standards had resulted in a great increase in the number and variety of electrical appliances required in the American home and they were informed that according to a survey made a few years previously the average American householder had at least 70 electrical devices in use and thus the need for a high number of outlets became vitally important. It was even suggested that there were often enough electrical outlets in the perimeter of any room so that no matter where there is a portable lamp or an appliance the standard cord length of 6ft will reach the outlet.

Plumbing

A paragraph on plumbing and bathrooms suggests that all plumbing pipes are fixed before the dry wall construction and that flushing cisterns or waste-water preventers are not used in the parts of the country which the team visited, flushing being carried out with a press-button single pipe system. The Report recommends that this method should be further developed here as it has a better appearance, requires less space and overcomes the need for heavy cisterns and wall brackets. The Report says that American bathrooms are show places by comparison with those in most British homes. Lavatory basins and baths are generally of pressed steel, finished in attractive coloured stove enamel. Many bathrooms have two lavatory basins and there is now a tendency in some districts to build no more houses with one bathroom only.

American Kitchens

The Report states that the kitchen is the outstanding feature of houses in the United States and it is normal, even in low cost housing, to find many appliances which are not customary here, for example, the average new American house is fitted with 10 or 11 cu ft refrigerators allowing the American housewife to shop once a week and to keep all food in a deep-freeze. Dish-washers, electrically operated sinks fitted with garbage disposal units, automatic laundry equipment and exhaust fans over the cooker are quite general in minimum price houses.

A feature which impressed the British builders was the almost general absence of gutters and down-pipes on new houses, with a consequent need to grade the soil around the houses to carry off the water. Some of the members appeared to think that this omission constitutes a weakness likely to result in dampness, evidence of which was noted in some cases.

Land Use and Plot Sizes

The team appeared to have noted that there seemed to be no indication in the areas they visited of any scarcity of land and thus the average house plot was about one-quarter of an acre with a frontage of about 60ft compared with perhaps 30ft in Britain. Back gardens on the other hand are not usually as deep as those in this country and it is stated that it would seem to be quite exceptional for a house owner to cultivate his back-garden which is used exclusively as recreation space and is usually planted with shrubs and trees and grassed over by the developer. Carriage ways of at least 20ft were general in the areas visited. The larger frontages involved a higher proportion of road to house cost than is usual in Britain although in some cases acceptable specifications for road construction appeared to be more economical than those in Britain.

Conclusions

The Report ends with ten conclusions which the team felt merited consideration in this country. The first conclusion is that the fundamental factor in American house building production appears to be the attention given to design to fulfil the carefully analysed living requirements of the family in such a way as to produce an effective dwelling unit, while paying full regard to simplified construction techniques. The second conclusion relates to simplified construction built for a shorter life and although doubt is expressed whether the British attitude towards housing standards could be readily changed it is considered that this matter deserves further consideration. Thirdly it is felt that closer attention needs to be given to the standard of house heating and insulation, while in the fourth conclusion it is felt that the American success in simplified plumbing and lavatory equipment is a lead worth following in this country. The fifth conclusion is merely an observation that cheaper kitchen equipment and fittings are available in America.

The sixth conclusion is that modular co-ordination can be of great benefit in the mass production of houses if its possibilities are fully appreciated by designers, builders and material producers.

The remaining conclusions relate specifically to the arrangements for house building and land development, excepting number eight which states that the American building operative works no harder than his British colleague, but frequently with greater effectiveness due to the acceptance of the need for high output.

A fragment of sheepbone floor in the entrance to Stiles' Almshouses, Wantage, Berks; a link with the neighbouring Downs

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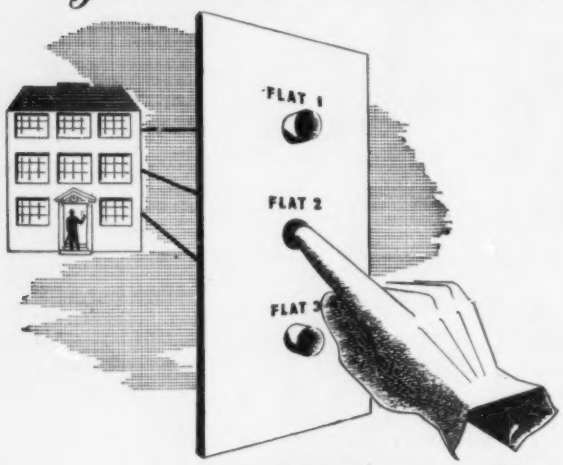

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Industrial Notes

● One of the largest stands at next month's Packaging Exhibition will be that of the Reed Paper Group. It will cover an area of 2,700 sq ft and be topped by a 30ft high suspended column of multi-coloured paper and boards. Murals, designed by artists such as Victor Passmore and John Minton, will be a prominent feature of the stand which together with the displays has been designed by Arthur Braven, who is also working on the British Industrial Pavilion for the 1958 Brussels World Fair.

● An extension is being built to the British Railways' Mayors Walk Staff Hostel, at Peterborough, which will provide a further 46 bedrooms and ancillary accommodation. The extension was designed by Mr. H. H. Powell, Regional Architect, under the general direction of Mr. A. K. Terris, Chief Engineer, Eastern Region. Main contractors are Bovis Ltd.

● Du Pont (United Kingdom), the British offshoot of E.I. du Pont de Nemours, the American chemical group, is proposing to build a neoprene synthetic rubber plant on a 381 acre site near Londonderry. Providing surveys are successful, construction is expected to start early in 1957.

● Bulletin no. B 181, obtainable from the Yale & Towne Manufacturing Co., Wednesfield, Wolverhampton, describes the construction of their plain and geared trolleys from ½ to 10 tons in capacity. In addition, the bulletin provides useful tables of operating data and dimensions.

● Slough Metals Ltd., of Oxford Avenue, Trading Estate, Slough, Bucks, announce that they have appointed F. R. Warren & Co., 27 St. Nicholas Street, Bristol (telephone: Bristol 2-8493) as their technical representatives in the West Country.

● The Board of Trade are making arrangements for reducing their stocks of lead and zinc. This is in accordance with the policy announced in February in the Defence White Paper (Cmd. 9691 paragraph 125) of running down the strategic holdings of industrial raw materials. They are anxious to make their disposals of lead and zinc without unduly disturbing markets and will shortly be discussing methods of doing this with trade representatives. No sale will be made before the middle of January, 1957.

● The Council of the O.E.E.C. has appointed Dr. Alexander King, C.B.E., as Deputy Director of the E.P.A. On January 1, 1957, he will succeed Mr. Edwin Fletcher who has returned to the T.U.C. from which he was seconded in 1955. As a Chief Scientific Officer in the D.S.I.R., which he joined in 1950, Dr. King has been responsible for work on productivity (including research on industrial operation, human relations and industrial economics), technical information services and overseas scientific relations.

The Alamein Centre for the Territorial Army in Liverpool has a Drill Hall spanned with steel roof trusses and covered with asbestos sheeting. It is lined with ½in Celotex "Highlight" insulation board, using the exposed fixing system of aluminium alloy T section. Architects : Ormrod & Partners

● The Chairman, Mr. S. A. Sadler Forster, C.B.E., in addressing the annual general meeting of North Eastern Trading Estates Ltd., said that employment over the twelve months ending October, 1956, had risen by 1,486. The engineering and allied industries group had taken on 4,000 extra people in the last four years. The accounts for year ended March 31, 1956, showed that expenditure on land and buildings had increased by £1,412,276 during the year and the capital assets for which the Company is responsible stood at £17,597,686.

● The annual general meeting of E.J.M.A. on November 22 followed a dinner dance held at the May Fair Hotel on the preceding evening. At the meeting, Mr. Walter Hide was elected President in succession to Lieut.-Col. S. R. Sharp, J.P. Col. Sharp, in addressing the meeting, stated that the number of homes to be completed during 1956 would probably reach 300,000, but he forecast the figure for 1957 as somewhere in the region of 270,000 houses commenced. Mr. W. R. Price and Mr. G. Whitaker, J.P., were respectively re-elected and elected Vice-Presidents. Mr. I. A. Rutherford was re-elected as Hon. Treasurer.

● Mr. H. F. Akehurst, B.Sc., A.M.I.E.E., has been appointed to the Board of British Insulated Callender's Cables Ltd. and will hold the position of Director (Overseas Operations).

● The new address of the Metropolitan Construction Co. Ltd., will be Greenwich House, 11-13 Newgate Street, London, E.C.1. Telephone No.: City 1488.

● Consett Iron Co. Ltd. announce trading profit for the year ended September 29, of £2,660,646 which shows an increase on the previous year's result of £1,189,337. The final dividend is 4½ per cent giving a total of 7½ per cent.

● Roads Reconstruction (1934) Ltd. have returned a record trading profit of £231,458 for the year ended March 31. A final dividend of 6½ per cent has been approved, making the total of 10 per cent less tax for the year.

● The Stavely Coal & Iron Co. Ltd. report that the Group earnings for the year ended June 30, 1956, show a drop of £17,940 to £1,745,886. A final dividend of 10½ per cent has been approved, making a total of 15 per cent.

CORRECTION

The name of the makers of the Rayburn domestic oil-fired boiler, which was reviewed on page 772 of A. & B.N., December 6, should be amended to read as Allied Ironfounders Ltd., 28 Brook Street, London, W.1. Grosvenor 8941.

NEW PRODUCTS

In this feature are reviewed new lines introduced to the building industry for the first time and additions or improvements to existing ones. Any advantages claimed for a product are from information supplied by the manufacturer

The "Knight" convector fire, Fig. 1, has been designed for the burning of all types of solid fuel. It will fit most fireplaces with openings of 16in width and between 21 and 25in in height and with standard firebrick backs. The air intake is underneath the bottom plate and rate of burning can be regulated by adjustment of the inlet. A restricted chimney throat is incorporated. In addition to the design illustrated, a plain style can be supplied and finish is in pewter or copper Lustre.

Bilston Foundries Ltd., Highfields, Bilston. Bilston 42331.

★

The Multiseal Slab Urinal, Fig. 2, incorporates special joints designed to overcome the possibility of seepage into floor and through ceilings. Special attention has been given to the points between slabs and channels and between channel sections. The urinal is made in white vitreous glazed fireclay and is covered by provisional patent.

Broad & Co. Ltd., 4 South Wharf, Paddington, London, W.2. Paddington 7061.

★

The new Kieft-Stuttard fully automatic oil-fired boiler, model K.S.20. C.1., Fig. 3, is made with either top or back flue entry and has an output rating of 20,000 B.Th.U/hr. The boiler must have an independent flue and no dampers should be fitted. The draught regulator on top of boiler must be adjusted to give reading of 0·06 in water gauge when tested at burner door. It is designed for use with an indirect cylinder which should be installed as close as possible to the boiler and wherever practicable, fixed vertically. Overall measurements, 50in high by 20in wide by 14in deep. Makers recommend gas oil, domestic fuel oil, light fuel oil, kerosene or any intermediate fuel oil and quote input as 1·58 pints/hr.

Cyril Kieft & Co. Ltd., 13 Dudley Road, Wolverhampton, Staffs. Wolverhampton 24046

★

An additional thickness of $\frac{5}{8}$in is announced by the makers of Gold Label Weyroc woodchip board. The other thicknesses in the range are $\frac{1}{4}$in and $\frac{3}{8}$in. Boards are made to a size of 8ft by 4ft and the price range per sq ft ex works is $\frac{1}{4}$in—1s 2d, $\frac{5}{8}$in—1s 3½d, and $\frac{3}{8}$in—1s 5d.

The Airscrew Co. & Jicwood Ltd., Weybridge, Surrey.

★

This company has recently introduced a quick drying emulsion varnish which has been produced to give a protective coating to wallpaper, flat oil paint, water and emulsion paints. The treated surface can be cleaned if necessary by a damp cloth. Covering capacity is approximately 90 sq yds/gallon.

Mander Bros. Ltd., St. John Street, Wolverhampton. Wolverhampton 20601.

★

The new Fosterlite translucent corrugated sheeting is manufactured from glass fibre reinforced plastic. It is claimed to be comparable on a strength to weight ratio basis to steel. Suggested uses are for rooflights and interior partitioning. It is available, both clear and coloured, in lengths from 3ft to 8ft and in a wide range of standard profiles.

Foster's Reinforced Plastics (Rainford) Ltd., Rainford, St. Helens, Lancs. Rainford 331.

★

It is claimed that the recently introduced Duraflex threshold provides a positive seal against rain, snow, dust and draughts. The fitting is made from flexible vinyl plastic arched in an aluminium base and this provides a spring action against the bottom of the door. Vinyl strips along the bottom of the threshold prevent water seepage. The fitting may be fixed with wood screws or built into a cement floor. It measures $\frac{1}{4}$in high by 3½in wide by standard lengths of 30, 32 and 36in. Other lengths up to 20ft are available.

Adams & Benson (Dalbukirk) Ltd., Oldbury Road, West Bromwich. West Bromwich 0561.

★

It is claimed that the new No. 81 Ultravar Epikote transparent varnish, unlike other epoxide resin varnishes, can be easily applied by brush. It is pale in colour and is touch dry in 1½ hours and hard dry in five hours.

*Walter Carson & Sons Ltd., Grove Works, Lombard Road, London, S.W.*11. *Battersea* 2451.

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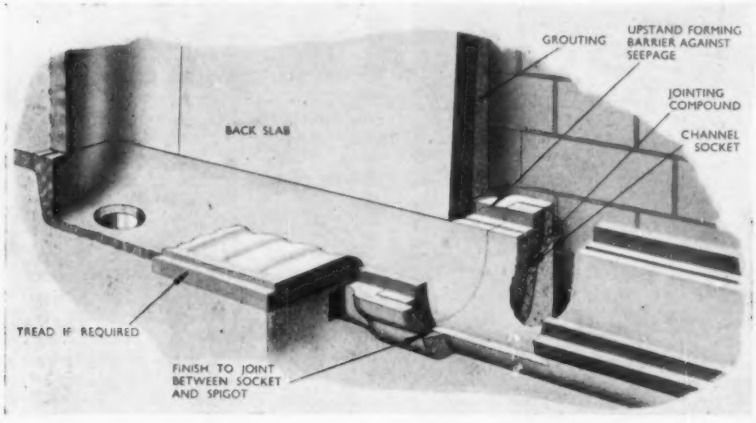

2

3

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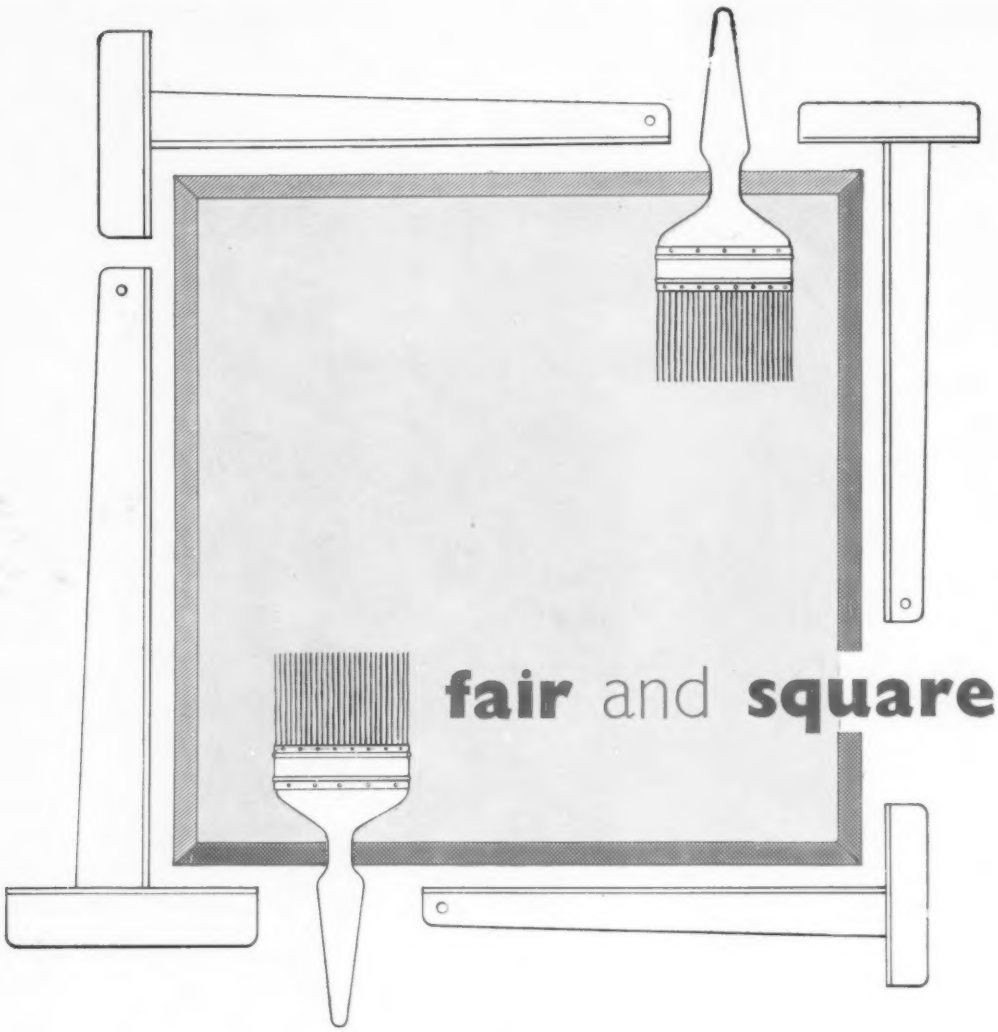

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11 Waterloo Street, Birmingham, 2. Tel: Midland 6565-6-7

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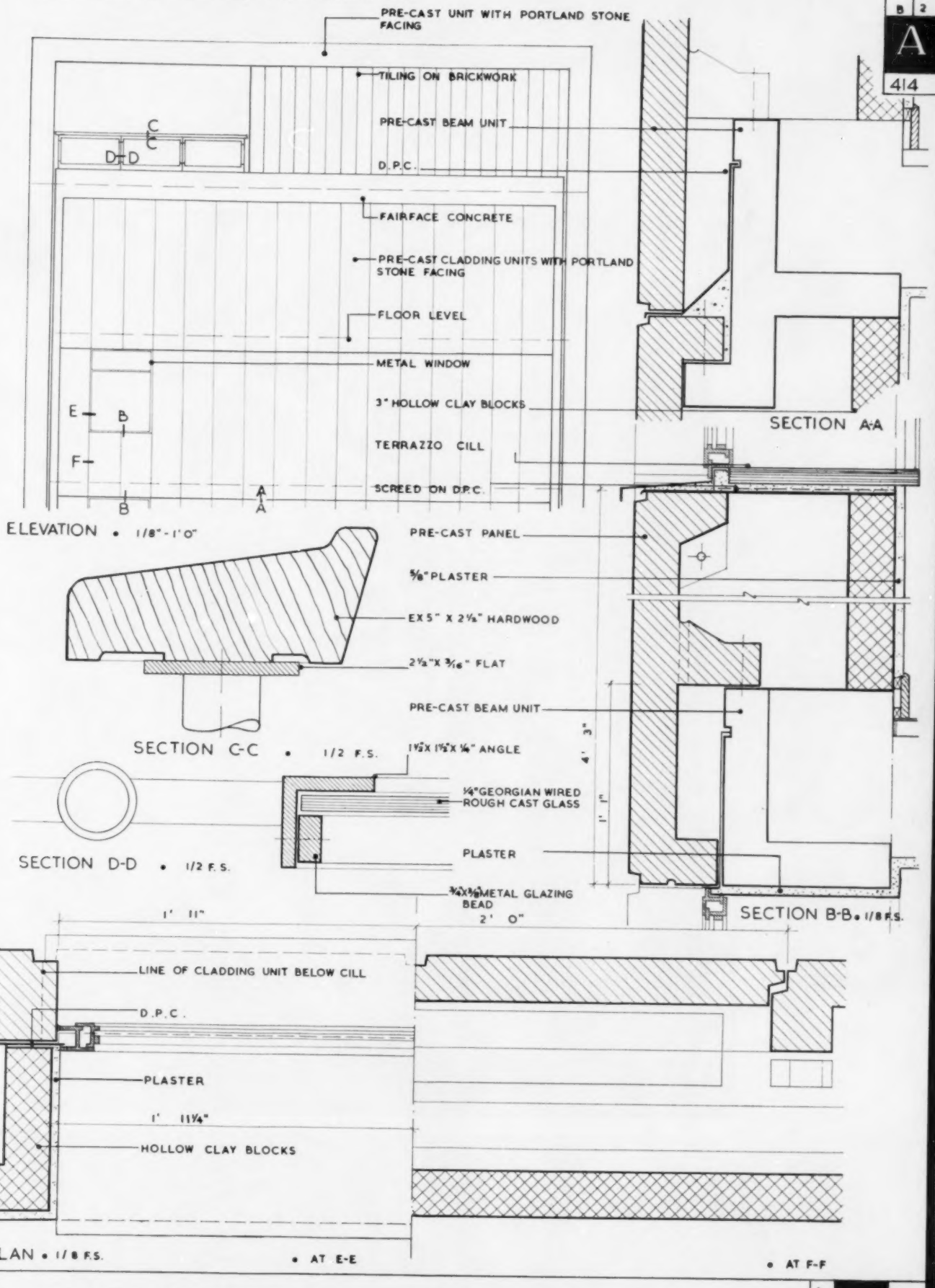

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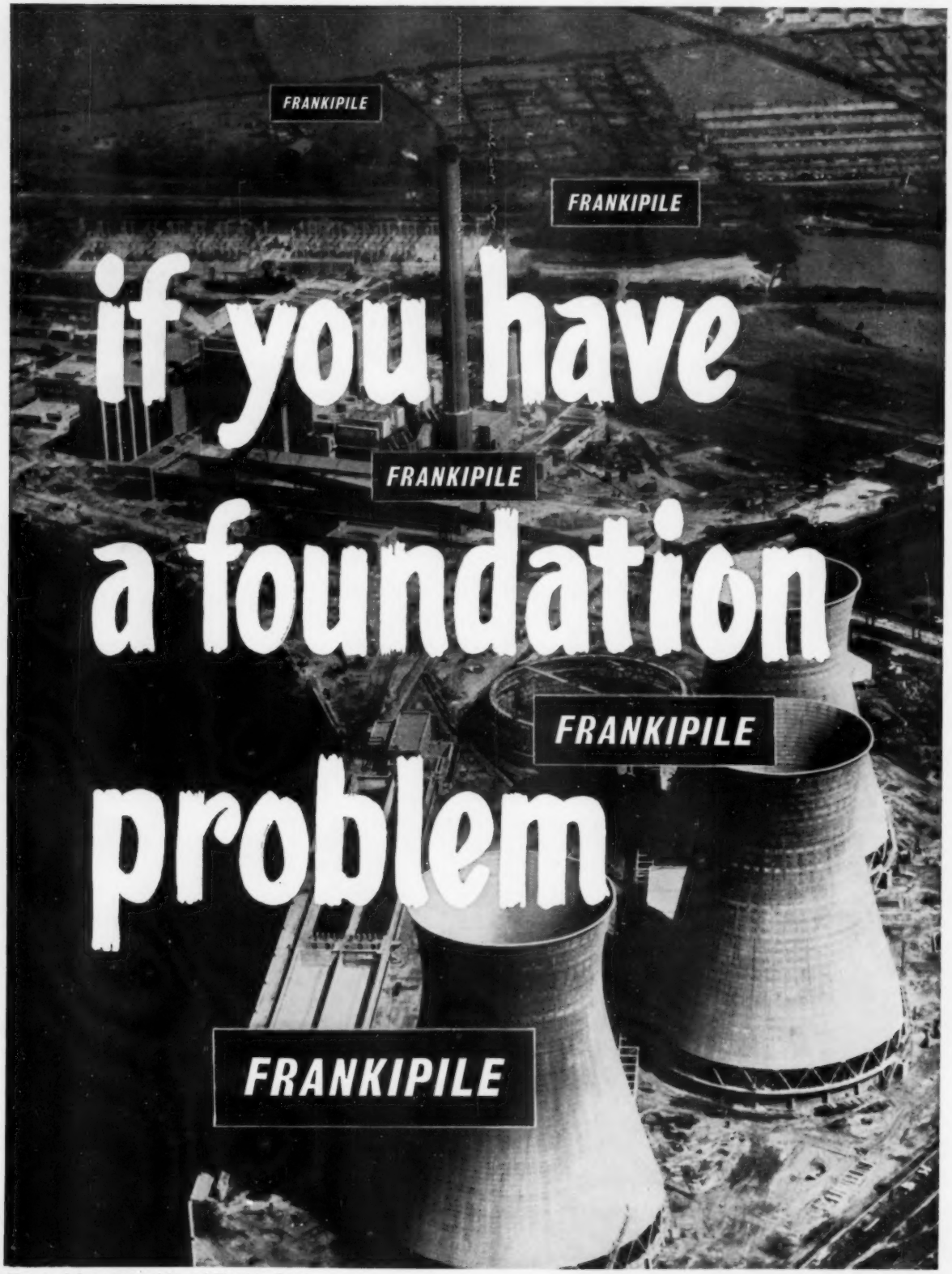

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*Notes below give basic data of contracts open under locality and authority which are in a bold type. References indicate : (a) type of work, (b) address for application. Where no town is stated in the address it is the same as the locality given in the heading, (c) deposit, (d) last date of application, (e) last date and time for submission of tenders. Full details of contracts marked * are given in the advertisement section.*

CONTRACT • NEWS •

OPEN

BUILDING

BARNSLEY B.C. (a) Erection and completion of 52 houses and 32 houses at Yews Farm estate extension. (b) Borough Engineer, Town Hall. (c) 2gns. (e) December 28.

* * *

BURNHAM-ON-CROUCH U.C. (a) Nine houses on the Orchard Road estate. (b) Stanley Bragg, 119-121 High Street, Witham, or Deputy Clerk of the Council, Council Offices, 10 High Street, Burnham-on-Crouch. (c) 2gns. (e) December 31.

* * *

CARLISLE C.C. (a) Erection of the final stage of the new technical college. (b) Messrs. Buckland and Haywood, Norwich Union Chambers, Congreve Street, Birmingham, 3. (c) £3. (d) January 7. (e) February 12.

* * *

COVENTRY CORPORATION. (a) Erection of needlework and music rooms at Barrs Hill school. (b) City Architect and Planning Officer, Bull Yard. (c) 2gns. (d) December 28. (e) January 21.

* * *

CROSBY, LITHERLAND AND WATERLOO JOINT CEMETERY BOARD. (a) Erection of a single-storey office and store buildings, together with a short roadway, paths and drains at Thornton Garden of Rest. (b) Messrs. Ashcroft and Parkman, 38 The Temple, Dale Street, Liverpool, 2. (c) 3gns by cheque, payable to Board. (e) January 7.

* * *

DONCASTER R.C. (a) Erection of (1) 40 houses at Campsall Park; (2) 42 houses at Edlington; and (3) 26 houses at Rossington. (b) Council's Surveyor, Nether Hall. (e) January 11.

* * *

EAST SUFFOLK C.C. (a) Erection of extensions estimated to cost £56,000 at Alderman Woodrow secondary school, Lowestoft. (b) County Architect, County Hall, Ipswich. (d) January 4. (e) February 8.

* * *

HAMPSHIRE C.C. (a) Erection of a divisional surveyor's office and pair of roadmen's cottages at Harts Lane, Burghclere. (b) County Architect, The Castle, Winchester. (c) 1gn. (d) December 31.

* * *

HAMPSHIRE C.C. (a) Erection of "Rotherley" Boarding House at Winchester high school. (b) County Architect, The Castle. (d) December 28.

* * *

LEATHERHEAD U.C. (a) 34 dwellings at Ashtead, Surrey. (b) Council's Surveyor, Red House. (c) 2gns. (e) January 21.

* * *

LEEDS REGIONAL HOSPITAL BOARD. (a) Carrying out an extensive scheme of alterations to the psychiatric unit at St. James's Hospital, Beckett Street, Leeds, 9. (b) Board's Architect, Park Parade, Harrogate, Yorks. (c) 2gns. (d) December 29. (e) January 26.

* * *

LEEDS REGIONAL HOSPITAL BOARD. (a) Carrying out alterations and repairs to a pair of semi-detached

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* * *

LEEDS REGIONAL HOSPITAL BOARD. (a) Carrying out improvements to Ward 4 at Castle Hill Sanatorium, Cottingham, E. Yorks. (b) Board's Architect, Park Parade, Harrogate, Yorks. (c) 2gns. (d) December 31. (e) January 22.

* * *

LEEDS REGIONAL HOSPITAL BOARD. (a) Carrying out the provision of covered ways and the installation of a bed lift at Staincliffe General Hospital, Dewsbury. (b) Board's Architect, Park Parade, Harrogate, Yorks. (c) 2gns. (d) December 31. (e) January 24.

* * *

LINCOLN C.C.—PARTS OF KESTEVEN. (a) Proposed erection of extensions to complete the existing college building at Grantham College for Further Education. (b) County Architect, County Offices, Sleaford, Lincs. (d) January 22. (e) February 26.

* * *

LINDSEY C.C. (a) Erection of a swimming bath, gymnasium and dining room at Humberston Foundation school, Cleethorpes. (b) County Architect, County Offices, Lincoln. (e) February 6.

* * *

NEWCASTLE UPON TYNE C.C. (a) Eight houses in Bosworth Gardens. (b) City Architect, 18 Cloth Market, Newcastle upon Tyne, 1. (e) January 4.

* * *

NEWCASTLE UPON TYNE C.C. (a) 32 flats and maisonettes in three storeys on the Fairways estate, Section "B", Benton. (b) City Architect, 18 Cloth Market, Newcastle upon Tyne, 1, in writing. (e) December 27.

* * *

N. IRELAND—BELFAST C.C. (a) Erection of sub-station buildings and transformer foundations at Salisbury Avenue (form No. 2004). (b) Merz and McLellan, Carliol House, Newcastle upon Tyne, 1. (c) 5gns by cheque, payable to Belfast Corporation, Electricity Department. (e) December 28.

* * *

N. IRELAND—DOWN C.C. (a) Supply and erection of structural steelwork for the new Council Offices in English Street, Downpatrick. (b) County Planning Officer, Courthouse. (c) 2gns by cheque. (e) January 9.

* * *

N. IRELAND—LIMAVDY. (a) Erection and completion of an intermediate school at Irish Green Street, for the Very Rev. A. O'Doherty. (b) W. J. Doherty and Co., 12 Castle Street, Derry, or P. Davidson, 16 High Street, Belfast. (c) 16gns. (e) January 8.

* * *

N. IRELAND—TYRONE C.C. (a) Erection of a primary school at Innismagh, 2½ miles from Ballygawley and 11½ miles from Dungannon. (b) County Education Architect, Education Offices, Omagh. (c) 5gns. (e) January 23.

* * *

NORTH RIDING E.C. (a) Extensions at Malton grammar school. (b) F. Barraclough, County Hall, Northallerton, or F. X. Velarde, 9 Windsor Builders, George Street, Liverpool, 3. (e) January 11.

* * *

NORWICH C.C. (a) 98 dwellings on Heartsease estate. (b) City Architect, City Hall. (e) January 14.

* * *

PUDSEY B.C. (a) Separate trades in connection with the erection of 20 flats, one house, 14 houses and ten garages at Acres Hall. (b) Borough Surveyor, Town Hall. (c) 2gns each trade. (e) January 5.

* * *

REIGATE B.C. (a) Conversion of Park House, Park Lane Estate, into five self-contained flats, together with certain site works. (b) Borough Engineer, Town Hall. (e) January 4.

* * *

REIGATE B.C. (a) Erection of (1) 10 houses at Brambletye Park Road, Redhill; and (2) 10 bungalows at "Ranmore", London Road, Redhill. (b) Borough Engineer, Town Hall. (c) 2gns each contract. (e) January 4.

* * *

RINGWOOD AND FORDINGBRIDGE R.C. (a) Four flats, four bungalows, ancillary drainage, access road and site works at Martin. (b) Frank Andrews, 58 Southampton Road, Ringwood. (c) 2gns by cheque. (e) January 5.

* * *

ROCHESTER C.C. (a) 14 maisonettes, 19 flats and two shops at Gravel Walk—redevelopment area. (b) City Surveyor, 66 Maidstone Road. (c) 2gns. (e) January 28.

* * *

SCOTLAND—GLASGOW CORPORATION. (a) 36 flats at Castlemilk Unit No. 5, South Area H5, Holmbyre Terrace. (b) Architectural Department, 20 Trongate, Glasgow, C.1. (d) December 27.

* * *

SCOTLAND—NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD. (a) Building works, in stone, of Lochay Power Station about two miles from Killin, Perthshire, comprising turbine house, control room, office block and transformer compound. (b) Messrs. Robert Matthew and Johnson-Marshall, 31 Regent Terrace, Edinburgh, 7.

* * *

SCOTLAND—SCOTTISH SPECIAL HOUSING ASSOCIATION. (a) All or separate trades for the erection of 10 houses at Barlinnie, Glasgow, and 2 houses at Polmont, Stirlingshire. (b) Scottish Special Housing Association Ltd., 15-21 Palmerston Place, Edinburgh, 12.

* * *

SOUTHAMPTON B.C. (a) Contract B.272. Seven shops and flats on the Aldermoor estate. (b) Borough Engineer, Civic Centre. (d) January 2.

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STOCKPORT CORPORATION. (a) Erection of three dwellings at Browning Road, 12 at Houldsworth estate, 18 at Brinnington and 8 at Hartingdon Road. (b) Borough Architect, Town Hall. (c) 2gns per job. (e) February 4.

* * *

SUNDERLAND B.C. (a) Erection of Castle View secondary school and Broadway secondary school on sites on the Hylton Castle estate, and The Broadway, Grindon. (b) Borough Architect, Grange House, Stockton Road. (c) 2gns. (e) January 18.

* * *

WEST BROMWICH E.C. (a) Erection of a special school, with assembly hall and caretaker's house, at West Bromwich. (Estimated cost is £53,000.) (b) Richard Sheppard and Partners, 5 Southampton Place, London, W.C.1, with brief details of work of a similar size and nature carried out. (e) Immediately.

* * *

WEST HARTLEPOOL B.C. (a) Proposed alterations and extensions at the high school for girls, Eldon Grove. (b) L. Auton, Regent Buildings, York Road. (e) January 31.

* * *

WEST RIDING OF YORKSHIRE C.C. (a) Erection of a caretaker's house at Swinton secondary school. (b) Deputy County Architect, Bishopgarth, Westfield Road, Wakefield. (d) December 29. (e) January 21.

PLACED

Notes on contracts placed state locality and authority in bold type with (1) type of work, (2) site, (3) name of contractor and address, (4) amount of tender or estimate. † denotes that work may not start pending final acceptance, or obtaining of licence, or modification of tenders, etc.

CENTRAL ELECTRICITY AUTHORITY. (1) Construction of nuclear power stations. (2) Bradwell, Essex. (3) Nuclear Power Plant Co. Ltd., c/o C. A. Parsons and Co. Ltd., Newcastle-on-Tyne. (2) Berkeley, Glos. (3) A.E.I.—John Thompson Nuclear Energy Co. Ltd., c/o A.E.I. Ltd., Crown House, London, W.C.2.

* * *

WISBECH. (1) Two blocks of 20 flats. (2) Stafford Street. (3) C. C. Coleman and Sons Ltd., 35-37 Leverington Road, Wisbech. (4) £29,157.

* * *

WALTHAMSTOW B.C. (1) 37 flats. (2) Shernhall Street. (3) Seivad Ltd., 12-16 Southend Road, Woodford, Essex.

* * *

BERKSHIRE C.C. (1) Secondary school. (2) Wallingford. (3) J. M. Jones and Sons (Builders) Ltd., Highway Works, Maidenhead, Berks. (4) £123,456.

* * *

TIPTON B.C. (1) 24 flats. (2) Tividale Street. (3) William Whittingham Ltd., Ettingshall Road, Wolverhampton. (4) £40,500.

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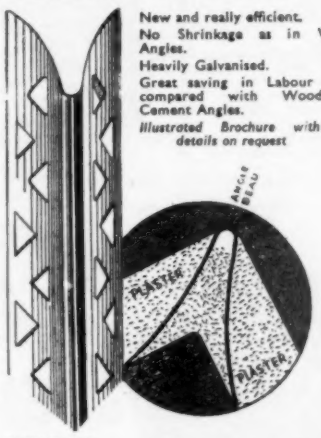

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SWINDON B.C. (a) 352 "Easiform" dwellings. (2) John Laing and Son Ltd., Mill Hill, London, N.W.7. (4) £525,001.

* * *

HULL. (1) Reconstruction of Riverside Quay, for British Transport Commission. (3) A. Monk and Co. Ltd., Padgate, Warrington. (4) £1,300,000.

* * *

SOUTHEND-ON-SEA B.C. (1) 195 dwellings. (2) Blythe Avenue. (3) C. S. Wiggins and Sons, Thundersley, Essex. (4) £293,000.

* * *

LARNE (NORTHERN IRELAND) B.C. (1) 174 houses, 44 flats. (2) Antiville. (3) David Keown, of Mallymena, Co. Antrim. (4) £315,271.

* * *

LEICESTER CITY COUNCIL. (1) 500 "Easiform" dwellings. (2) Eyres Monsall estate. (3) John Laing and Son Ltd., Mill Hill, London, N.W.7. (4) £63",142. (1) 200 traditional houses. (3) William Deane (Leicester) Ltd., Kirby Road, Leicester. (4) £271,895.

* * *

WORCESTERSHIRE C.C. (1) Secondary school. (2) Sionhill, Kidderminster. (3) A. H. Guest Ltd., of Stourbridge, Worcs. (4) £156,275.

* * *

BIRMINGHAM CITY COUNCIL. (1) Multi-storey flats. (2) Bangham Pit estate, Bartley Green. (3) Wates Ltd., 1258 London Road, Norbury, London, S.W.16.

* * *

WORTHING. (1) 30-bed extension at Tarring Priory Old People's Home. (3) Field Place Builders Ltd., of Worthing. (4) £35,542.

* * *

LOWESTOFT B.C. (1) 40 houses. (2) Beeches Estate. (3) J. Gaze and Sons Ltd., Kimberley Road, Lowestoft. (4) £59,422. (1) 96 houses. (2) Same estate. (3) H. A. Holmes and Sons Ltd., South Teehouse Hill, Gorleston-on-Sea. (4) £149,362.

* * *

BOURNEMOUTH. (1) Pathological laboratory. (2) Royal Victoria Hospital. (3) Burt and Vick Ltd., 63 Market Street, Poole, Dorset. (4) £44,000.

* * *

SOUTHWARK B.C. (1) 16 flats, 2 maisonettes, 2 shops. (2) Manor Place. (3) William Willett Ltd., Sloane Square, London, S.W.1. (4) £44,247.

* * *

WHITLEY BAY B.C. (1) Shops and maisonettes. (2) Earsdon Grange estate. (3) S. Storer, Langley Avenue, North Shields. (4) £20,254.

* * *

WHICKHAM (CO. DURHAM) U.D.C. (1) 165 houses. (3) E. Jeffcock (Contractors) Ltd., 107 New Bridge Street, Newcastle-on-Tyne.

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BEAMINSTER (DORSET) R.D.C. (1) 22 dwellings. (2) Gerrards Green. (3) W. T. C. Mudford and Sons Ltd., Bridport, Dorset. (4) £32,600.

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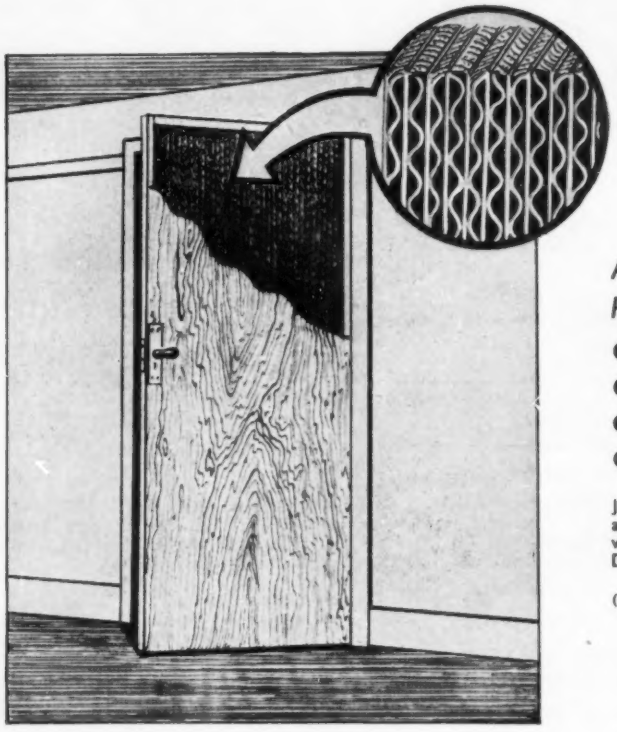

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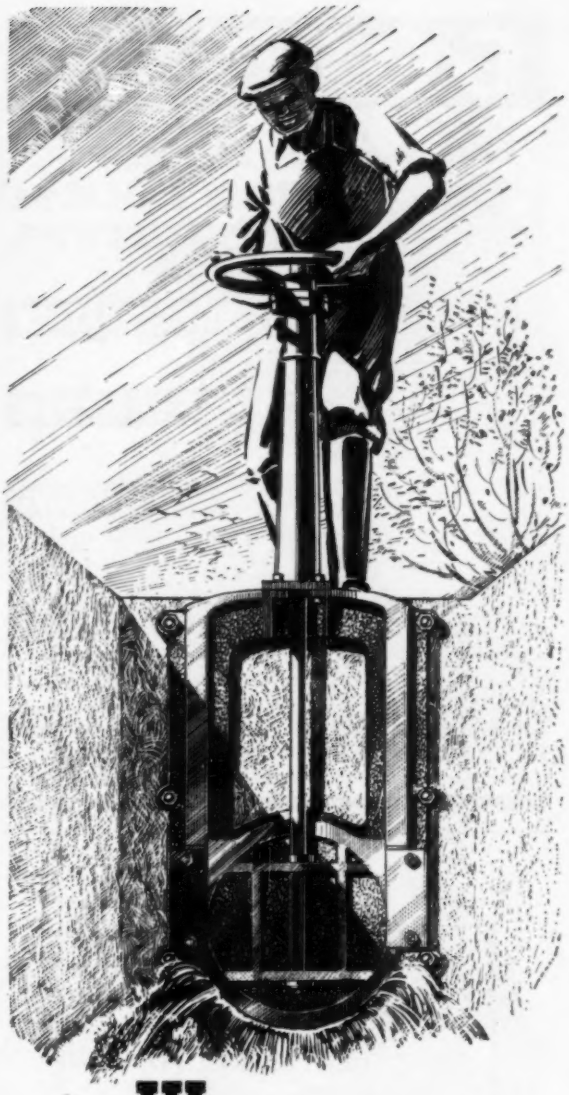

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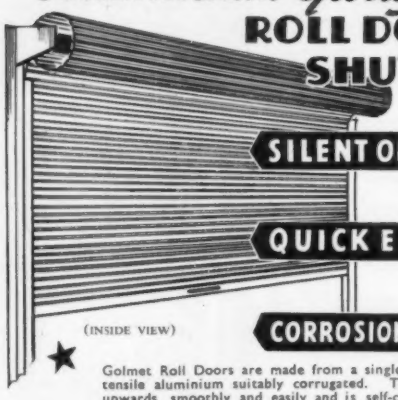

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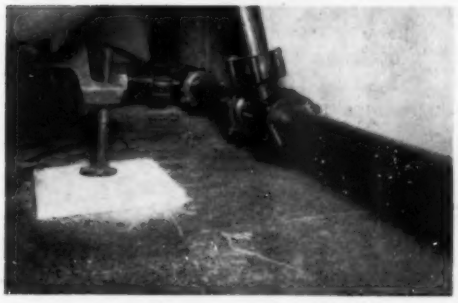

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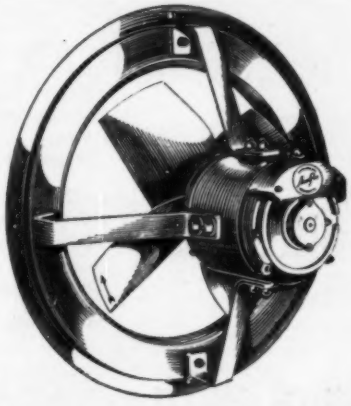

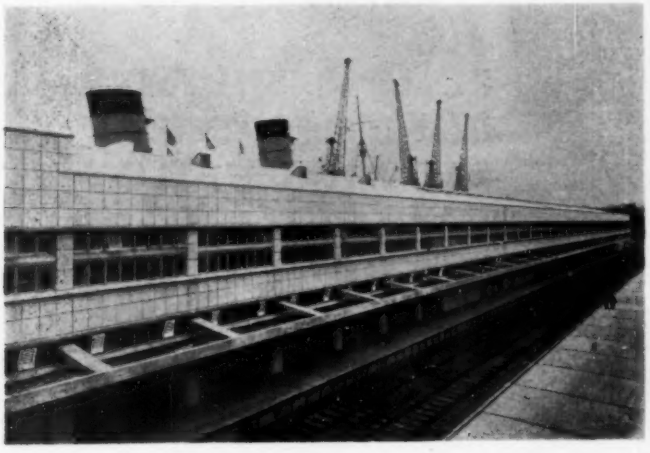

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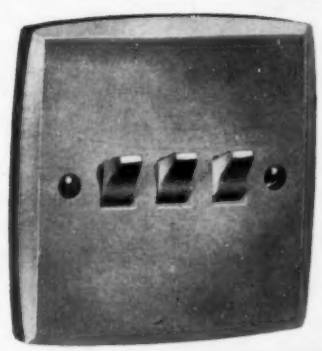

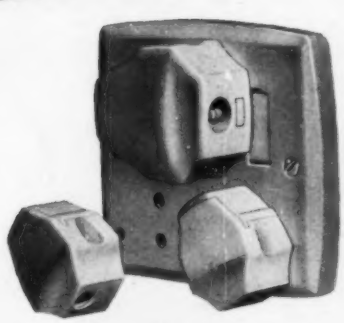

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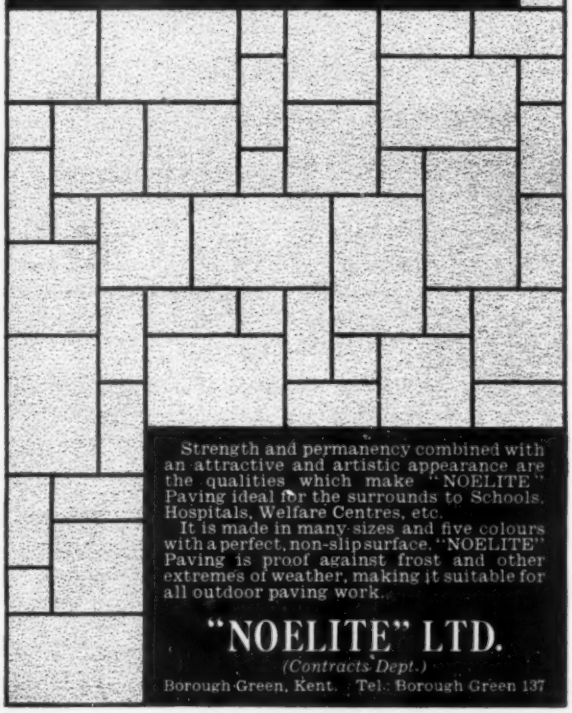

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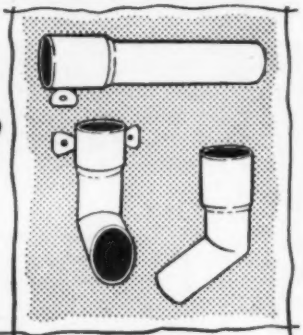

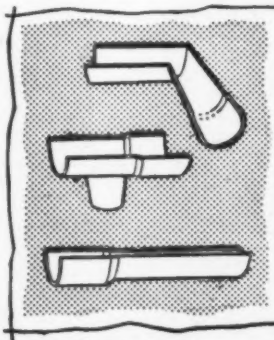

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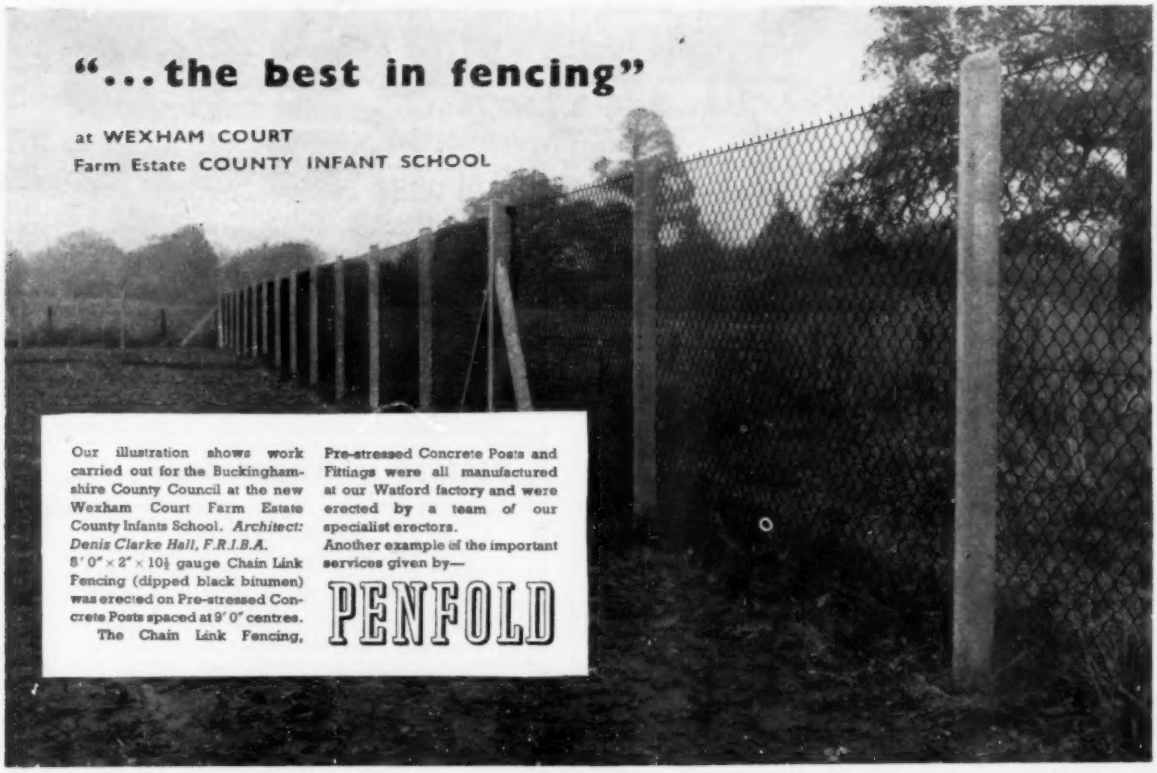

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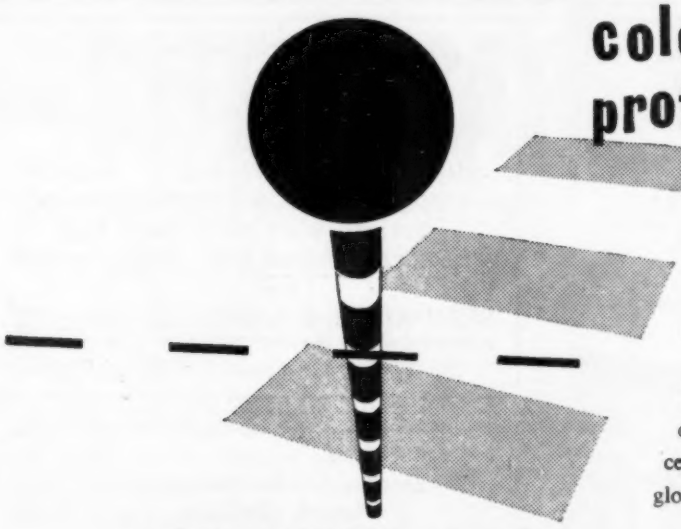

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COLOURS INCLUDE: BLACK, WHITE, GREEN, RED, BROWN, GREY, CREAM & ALUMINIUM

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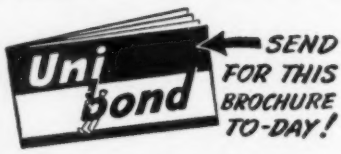

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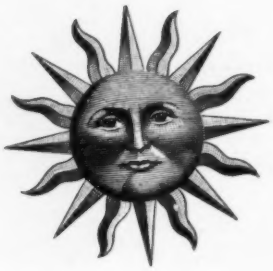

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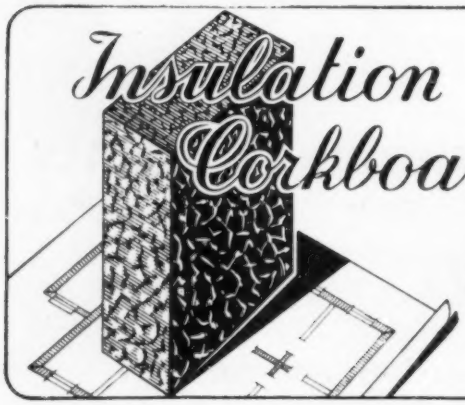

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Rust-Proofing with 'Rust-Anode'

Manufactured at Redhill, Dublin, Johannesburg, Brussels and Wiesbaden and used throughout the world

'RUST-ANODE' is in the nature of a paint and is normally applied to a steel surface by brushing ; it leaves a coat of pure zinc which is strongly adherent, age-proof and rust-proof. Experiments have shown that the degree of protection afforded by such materials increases with the pure zinc contents of the coating. This protection is obtained in the highest degree by 'RUST-ANODE,' which gives as much as 95% of pure zinc in the dried film without sacrificing any essential characteristics. It is for this reason that 'RUST-ANODE' is referred to as 'cold galvanizing,' since it gives an equivalent type of coating and when correctly applied has superior inhibitive qualities. One of the reasons for this superiority is that no intermediate film of brittle and rapidly corrodible iron-zinc alloy is formed as is inevitable with the hot-dip process.

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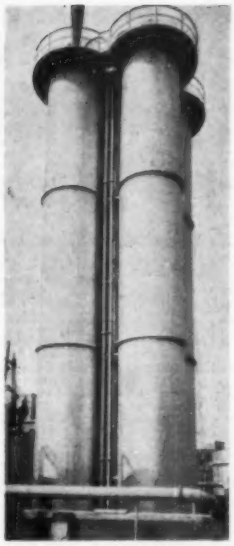
This has been conducted by the Chemical Inspectorate of the Ministry of Supply and by an independent testing house indicated by the British Standards Institution.

Comparative tests were conducted simultaneously with 'Rust-Anode,' electro-zinc plating, hot spelter galvanizing, and red lead coatings. They conformed to the B.S. 1391 : 1952 performance tests for protective schemes ; they included the A.R.E. salt spray test and the C.R.L. sulphur dioxide test. The results, which may be inspected in our offices, fully justify the claims made for the product.



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Leather case for Instrument . . . £2.10.0
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Instrument erected in 1 minute, angle set out in less than two minutes.

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APPLICATIONS are invited for the post of Junior Architectural Assistant within the salary grade £180 x £20 x £25 (12)—£500. Higher General Division Commencing salary within the grade will be decided according to experience and ability.

Superannuation schemes. Medical examination. Housing available in due course. Apply by January 4, 1957, giving age, education and qualifications; experience and appointments held (with dates and salaries) and two referees, to General Manager (J.A.A.), Bracknell Development Corporation, Farley Hall, Bracknell, Berks. [2952

WELSH REGIONAL HOSPITAL BOARD

APPLICATIONS invited from Registered Architects for 3 pensionable posts of Assistant Architects on permanent staff of Regional Architect, in Cardiff. Salary £680—£985.

Applicants must have passed final R.I.B.A., be well experienced in the preparation of 4th scale working drawings, details, specifications, surveying, levelling and supervision of contracts.

Applications, stating age, experience, qualifications, present position and salary, together with the names of two referees to Secretary, Temple of Peace, Cathays Park, Cardiff, as soon as possible. [2955

DORKING URBAN DISTRICT COUNCIL

APPOINTMENT OF ARCHITECTURAL ASSISTANT, GRADE A.P.T. III

APPLICATIONS are invited for the above Appointment, to be received within two weeks of the publication of this advertisement. Candidates must have had previous Architectural experience.

Full particulars of the Appointment may be obtained on application to the undersigned.

F. G. SUTHERLAND,
Clerk of the Council.

Pippbrook,
Dorking, Surrey.
December 14, 1956. [2963

GOVERNMENT OF UGANDA

ARCHITECTS, PUBLIC WORKS DEPARTMENT

FOR general architectural duties under the supervision of the Chief Architect.

Appointment on contract in first instance with prospect of permanency. Salary according to qualifications and experience in range £1,194—£1,863 p.a. Substantial gratuity on termination of contract. Free passages. Free medical attendance. Generous leave.

Candidates aged 25-35 years, must be A.R.I.B.A. Experience in tropical problems an advantage.

Write Director of Recruitment, Colonial Office, London, S.W.1, giving briefly age, qualifications and experience, quoting BCD 112/9/012. [2961

H. C. JANES LTD., have vacancies for Draughtsmen on the staff of their Planning Department.

(a) With experience in the design and constructional detailing of houses, shops, flats, factories etc.

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Staff pension scheme in operation and housing accommodation can be provided.

Apply at Head Office at 183 High Town Road, Luton, giving particulars of previous experience and stating salary required. [2945

DURHAM COUNTY COUNCIL

ARCHITECT'S DEPARTMENT

QUALIFIED Architects. Salary scale, A.P.T. V (£814 17s 6d to £994 5s). The appointments are subject to medical examinations for the purpose of the Local Government Superannuation Acts, the Council's regulations and the National Joint Council's Scheme for the time being governing payment of salary during sickness, annual leave and other conditions of service. Applications, including the names and addresses of two persons to whom reference may be made should be addressed to the County Architect, South Street, Durham. Canvassing members of the Council is prohibited.

J. K. HOPE,
Clerk of the County Council.
[2942

APPOINTMENTS—contd.

FIFE COUNTY COUNCIL

REQUIRED for Planning Department:

(a) **Deputy County Planning Officer**—Salary Scale, £1,150 by increments of £52 10s to £1,465 per annum with placing according to experience and qualifications. Should be members of Town Planning Institute, have good administrative and planning experience and be able to supervise technical staff.

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(c) **Planning Assistant**—Salary Scale, £580 to £700.

(d) **Planning Assistant**—Salary Scale, £550 to £625.

Applicants should have had appropriate training and experience in a planning office.

Superannuation Scheme on satisfactory medical report. Housing requirements may be met. No canvassing. Applications giving full particulars to be lodged by January 15, 1957 with the County Clerk, County Buildings, Cupar, Fife. [2957

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SENIOR ASSISTANT ARCHITECT

SALARY scale £824, rising to £1,024 p.a. (A.P.T.V.) plus London "Weighting", age 26 and over, £30 p.a. Applicants must possess an approved University degree in Architecture or be Associates of the R.I.B.A. Particulars and form of application from the Town Clerk, Lewisham Town Hall, Catford, S.E.6. Closing date, December 29, 1956. [2956

THE British Tabulating Machine Company Ltd., manufacturers of "Hollerith" equipment, has a vacancy for a Civil Engineer. This will entail responsibility for progressing new building projects and development schemes, including negotiation and liaison with architects and contractors, co-ordination of factory maintenance services and technical advice to Works Engineering Staff.

Candidates should be members of a professional institution and have had previous design and construction experience, preferably in the industrial field. Write, in the first instance, giving details of qualifications, and experience and stating salary required, to Personnel Superintendent, The British Tabulating Machine Co. Ltd., Letchworth, Herts, quoting Reference: AB/490. [2941

FEDERAL GOVERNMENT OF NIGERIA

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TO prepare sketch plant, working drawings and detailed specifications for various types of buildings and carry out general work of an Architectural Office.

Appointments on contract. Salary range £1,290 to £1,962 p.a. Gratuity £150 p.a.

Free passages for officer and wife and refund of up to cost of two adult passages for children. Allowance of £75 each for two children maintained outside the territory. Quarters, if available, at low rental. Generous home leave on full salary.

Candidates must be A.R.I.B.A., with wide general experience. Knowledge of Hospital planning would be an advantage.

Write Director of Recruitment, Colonial Office, London, S.W.1, giving briefly age, qualifications and experience quoting BCD112/14/04. [2953

LONDON COUNTY COUNCIL

ARCHITECT'S DEPARTMENT

VACANCIES for Architects Grade III (up to £987), and Architectural Assistants (up to £818), for widespread construction programme which includes houses, blocks of flats, schools of all types, and various public and industrial buildings.—Application forms and particulars from Architect (AR/EK/A/3), The County Hall, S.E.1. (1189). [0007

APPOINTMENTS—contd.

GOVERNMENT OF SARAWAK

ASSISTANT ARCHITECT, PUBLIC WORKS DEPARTMENT

TO prepare working drawings and specifications for Government schools and check designs and plans submitted for reconstruction and extensions of state-aided schools and institutions.

Contract appointment. Salary range £1,453 to £1,545 p.a. Gratuity £37 10s. for each three months resident service. Quarters, if available, at low rent. Free passages for officer, wife and up to three children. Generous home leave.

Candidates must be A.R.I.B.A. Experience in school design will be an advantage. Write Director of Recruitment, Colonial Office, London, S.W.1, giving briefly age, qualifications and experience, quoting BCD 112/24/012. [2960

TENDERS

CITY OF CARLISLE

TENDERS are invited for the erection of the final stage of the new Technical College, Carlisle. Bills of Quantities may be obtained from the Architects, Messrs. Buckland & Haywood, Norwich Union Chambers, Congreve Street, Birmingham, 3, on or before January 7, 1957, upon payment of £3, returnable on receipt of a bona-fide tender. Copies of the drawings may be seen by appointment at the Education Offices, 19 Fisher Street, Carlisle, or at the offices of the Architect.

It is anticipated that Tender Documents will be available for dispatch to contractors by January 17, 1957.

Tenders to be received by me by noon Thursday, February 21, 1957, in a plain sealed envelope endorsed "Tender—Technical College Extension," which shall not bear any name or mark indicating the sender.

Tenders should be accompanied by a list of buildings executed by the applicant and also photographs where possible.

H. D. A. ROBERTSON,
Town Clerk.

13 Fisher Street,
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Tenders are to be delivered to the Town Clerk not later than 12 noon on Tuesday, January 29, 1957.

W. O. DODD,
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[2959

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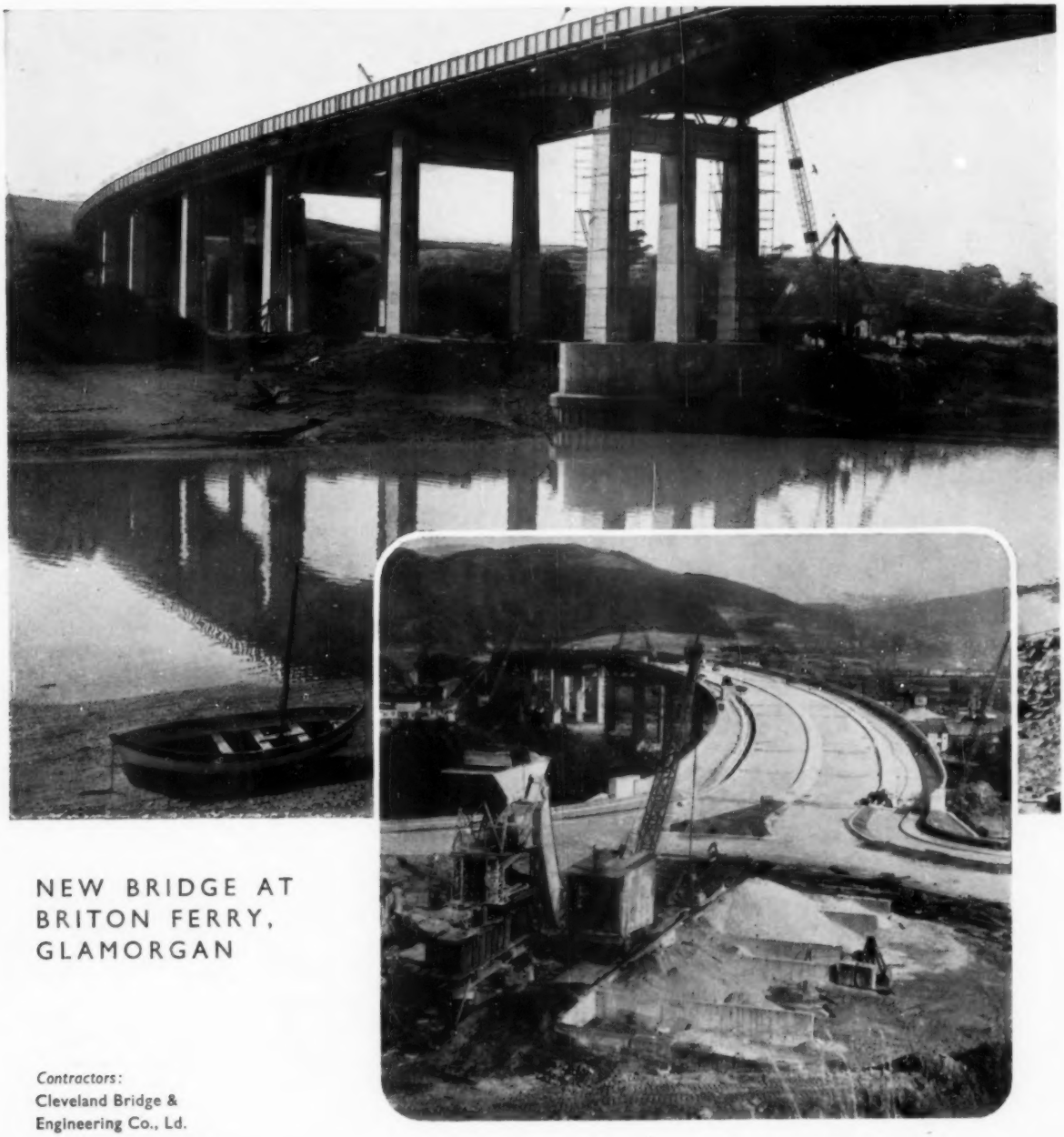

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